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# PATENT PRIORITY DISPUTES—A PROPOSED RE-DEFINITION OF "FIRST-TO-INVENT"

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## I. INTRODUCTION

Among the first legislation passed after the birth of the United States was a patent act. Based in part on the 1623 English Statute of Monopolies, in 1790 the United States Congress provided a limited monopoly to the creators of "any useful art, manufacture, engine machine or device, or any improvement therein not before known or used."[1] The English statute had provided a similar grant to the "first and true inventor" of a new

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1. Act of Apr. 10, 1790 § 1, 1 Stat. 109, 110 (1790). *See* 21 Jac. I, ch. 3. *See* Edward C. Walterscheid, *Priority of Invention: How the United States Came to Have a "First-to-Invent" Patent System*, 23 AM. INTELL. PROP. L. ASS'N Q.J. 263, 265 (1995). *See also* HAROLD G. FOX, MONOPOLIES AND PATENTS: A STUDY OF THE HISTORY AND FUTURE OF THE PATENT MONOPOLY 214 (1947). *But see* BRUCE W. BUGBEE, GENESIS OF AMERICAN PATENT AND COPYRIGHT LAW 12-56 (1967) (tracing the patent system to Renaissance Italy, and challenging to some extent the traditional view that the English Statute of Monopolies is the basis for the U.S. patent system). *See id.* at 157 (acknowledging English influence). *See also* Frank D. Prager, *Historic Background and Foundation of American Patent Law*, 5 AM. J. LEGAL HIST. 309, 318 (1961) (patent clause in U.S. Constitution "was the first announcement of any modern nation that patents for invention were going to be a means of progress . . . and [to] confirm the decision that intellectual property attaches to intellectual creation according to preexisting right and law").

and useful creation, and the new United States statute followed its example by bestowing the statutory property right on "the first and true inventor or discoverer."[2] For more than three centuries, the identity of the so-called first and true inventor has been a recurrent problem when more than one person independently creates the same thing.[3]

In patent terms, when two independent inventors lay claim to the patent for the same invention, a "priority dispute" arises. The mechanism for resolving the dispute before the United States Patent & Trademark Office (PTO) is called an "interference."[4] Priority disputes may also arise in the context of an infringement action, when the accused infringer asserts that the plaintiff was not the first inventor.[5] "Priority of invention is a question of law to be determined based upon underlying factual determinations."[6] To identify the first and true inventor and

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2. Act of Apr. 10, 1790 § 5, 1 Stat. 109, 111 (1790).

3. Walterscheid, *supra* note 1 at 268-69. In terms of the number of inventors who suffer the problem, however, the numbers are relatively small. In 1996, the U.S. Patent & Trademark Office (PTO) issued over 121,000 patents, of which 109,646 were utility patents. *Managing Change for Global Challenges, Fiscal Year 1996; A Patent and Trademark Office Review* (last modified June 26, 1997) <http://www.uspto.gov/web/offices/com/annual/1996>. The PTO estimates that 99.95% of patents are issued to the first inventor to file an application to patent a given innovation. AMERICAN INTELLECTUAL PROPERTY LAW ASSOCIATION, A GUIDE TO PATENT LAW HARMONIZATION TOWARDS A MORE INVENTOR-FRIENDLY WORLDWIDE PATENT SYSTEM § 4, (last modified Dec. 12, 1996) <http://www.aipla.org/harmoniz.html> [hereafter AIPLA GUIDE].

4. 35 U.S.C. § 23 (PTO rule-making authority), § 24 (subpoenas, witnesses), § 102(g) (priority rules), § 119 (foreign patent priority rules), § 120 (filing dates for previous applications), § 135 (interferences), § 141 (appeal to Court of Appeals for the Federal Circuit Court), § 146 (civil action in lieu of appeal), § 291 (civil action for interfering patent) (1994); 37 C.F.R. §§ 1.601 to 1.690 (1997) (interference regulations); UNITED STATES PATENT & TRADEMARK OFFICE MANUAL OF PATENT EXAMINING PROCEDURE (MPEP), chap. 2300 (interference procedure) (1994). *See, e.g.*, Sewall v. Walters, 21 F.3d 411 (Fed. Cir. 1994). As of September 30, 1996, there were 1,598 interferences pending before the PTO. 1996 PTO Ann. Rep., *supra* note 3. *See generally* MAURICE H. KLITZMAN, PATENT INTERFERENCE LAW AND PRACTICE (1984).

5. *See, e.g.*, Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1576 (Fed. Cir. 1996) (the defendant asserted that the invention had been known prior to the plaintiff's date of invention). As *Mahurkar* illustrates, the determination of date of "invention" need not be a simple contest between the patent holder and the accused infringer. The accused infringer may assert that some third party had invented the device prior to the patent holder, and that the device was anticipated in prior art.

6. Innovative Scuba Concepts, Inc. v. Feder Indus., Inc., 26 F.3d 1112, 1115 (Fed. Cir. 1994).

assign priority, of course, we must first define who we mean.

Theoretically, if two people simultaneously create the same new device,[7] a patent could be awarded to one inventor, both inventors, or neither inventor. The general approach world-wide is to award the patent to only one of the two inventors, with the disappointed inventor receiving nothing for his efforts.[8] As a matter of policy, the all or nothing approach is a corollary to the theory behind awarding a patent at all.[9] In economic terms, a patent is a limited monopoly awarded to remedy the problems created by the nature of an idea as a public good. The patent creates a property right for the inventor as an incentive to create.

The primary alternative to awarding the patent to the first to invent is to award it to the first inventor to file an application for the patent. In fact, every nation in the world except the United States and the Philippines follows a first-to-file system.[10] As

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7. The statute recognizes as patentable "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101 (1994). For the sake of clarity, the paper will simply use the term "device" to refer to any creation, reduced to practice, which has been submitted for a patent. An "invention" is a creation that has received the affirmation of patent status—i.e., it is new, useful, and non-obvious.

8. *See* Matthew P. Donohue, Note, *First-to-File vs. First-to-Invent: Will Universities be Left Behind?*, 21 J.C. & U.L. 765, 769 (1995).

9. *See infra* section III(B). Economic theory offers a comfortable explanation for granting the patent to only one inventor, but other theories, like labor-desert, have greater difficulty with the practice. *See* Tom G. Palmer *Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Subjects*, 13 HARV. J.L. & PUB. POL'Y 817, 829-30 (1990). In brief, a patent is a limited monopoly granted to cure the disincentive to produce a public good. It is a property right, granted to generate an incentive to produce the idea. Society derives no additional benefit from repeated production of the same idea, and so at the societal level, there is no point to awarding multiple patents. *See* JOHN W. SCHLICHER, PATENT LAW: LEGAL AND ECONOMIC PRINCIPLES § 1.04 at 1-10 (1997). At the individual level, economic theory suggests the danger that issuing more than one patent will defeat the purpose behind the patent, because the competition between overlapping patent holders will drive the market price below the level necessary for the creator to recoup the costs of creation.

10. Donohue, *supra* note 8, at 769. *See also* Jose J. Ferrer, Jr., *Phillipines: Patent Law and Practice* 7, 2 DIGEST OF INTELLECTUAL PROPERTY LAWS OF THE WORLD (1995). Some secondary authorities also cite Jordan as having a first-to-file system. I have been unable to verify this contention either way. *See* Ghaida Ala Eddein, *Jordan: Patent Law & Practice* 5, 2 DIGEST OF INTELLECTUAL PROPERTY LAWS OF THE WORLD (1995) (the description is not a model of clarity). I believe the authorities assigning a first-to-file system to Jordan are out of date.

the name suggests, under a first-to-invent system, the patent goes to the first inventor, regardless of the dates on which the inventors file their patent applications.[11] Which system is preferable has always been the subject of great debate in this country, particularly in the last thirty years.[12]

One prolific commentator, Edward Walterscheid, theorizes that the United States adopted for historical rather than logical reasons the first-to-invent system, as opposed to a first-to-file system, for resolving patent disputes. At the time of the debates for the first United States Patent Act, John Fitch and James Rumsey were embroiled in an on-going battle for the first steamboat patent, which Walterscheid suggests created pressure to avoid a first-to-file system.[13] Walterscheid may be right about why the United States failed to adopt a first-to-file system in its early years, but the modern priority rules are more fairly traceable to the Patent Act of 1836, as interpreted by United States Supreme Court Justice Joseph Story.[14]

As any first-year law student can tell you, Justice Holmes

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11. 35 U.S.C. § 102(g) (1994) provides:

A person shall be entitled to a patent unless . . . before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

12. "[T]he 1966 Presidential Commission on the Patent System addressed this precise question, and recommended that the United States adopt a first-to-file system." Gregory Aharonian, *Discussion of the Patent Office Reform Panel Final Report*, Feb. 4, 1993 (visited Apr. 22, 1998) <gopher://wiretap.spies.com:70/00/Gov/Patent/patent.1> (copy on file with the author).

13. Walterscheid, *supra* note 1, at 291-92. *See also* FRED WARSHOFSKY, THE PATENT WARS: THE BATTLE TO OWN THE WORLD'S TECHNOLOGY 40-47 (1994) (giving short history of the steamboat patent conflict).

14. "[H]e laid the cornerstone of American patent law." GERALD T. DUNNE, JUSTICE JOSEPH STORY AND THE RISE OF THE SUPREME COURT 112 (1971). "Story grappled with patent law in some forty opinions . . . . Neither in these opinions nor in his anonymous note on patents . . . nor in his *Commentaries on the Constitution* did he deal theoretically or comprehensively with the subject. He had no doubt, however, that the law should serve the public by encouraging invention." R. KENT NEWMYER, SUPREME COURT JUSTICE JOSEPH STORY 139 (1985). *See also* Frank D. Prager, *The Influence of Mr. Justice Story on American Patent Law*, 5 AM. J.L. HIST. 254 (1961) [hereinafter *Story's Influence*]; Frank D. Prager, *The Changing Views of Justice Story on the Construction of Patents*, 4 AM. J.L. HIST. 1 (1960) [hereinafter *Changing Views*].

once said that "[t]he life of the law has not been logic: it has been experience."[15] Perhaps no where is that statement more correct than in U.S. patent law for resolving priority disputes. A review of the historical development of U.S. patent priority doctrine shows that the current regime began with a mistake, then became increasingly complicated as the courts tried to mitigate the potential problems in the law. By 1952, the priority rules were a well-settled mess codified into a ill-shaped stasis. The U.S. first-to-invent system is a demonstration of the potential for the common law to go incrementally awry.

As a result, the debate about the relative merits of a first-to-file or first-to-invent system recurs almost annually, driven in recent years primarily by international efforts to harmonize patent laws world-wide.[16] Lost in the first-to-file versus the first-to-invent shuffle, however, has been any debate about whether the United States has the optimal definition for "first-to-invent." Simply saying that the patent goes to the first inventor does little to clarify what that means. Among the viable alternatives for the definition are to equate "invent" with "conceive," to require a working model before we recognize an invention, to require a fully developed invention ready for the commercial market, to require public disclosure of the idea, or even to equate the date of invention with the filing of the patent application.

Currently, the statute applies a mish-mash of all those ideas, and the policy arguments offered in support of the first-to-invent system are ex post justifications rather than explanations of concepts that drove the development of the rules. At the most basic, ideological level, the United States purports to look to the date of conception as the date of invention.[17] Rightly or wrongly, the formation of the complete idea has become for the United States the essence of the creative act. Nevertheless, to determine the identity of first inventor, the statute at times requires consideration not only of the dates of "conception" and "reduction to practice (RTP)," but also the "reasonable diligence" of an inven-

15. OLIVER W. HOLMES, THE COMMON LAW 1 (1881).

16. *See, e.g.*, Donald W. Banner, *Patent Law Harmonization*, 1 U. BALT. INTELL. PROP. L.J. 9 (1992).

17. *See, e.g.*, Sewall v. Walter, 21 F.3d 411, 415 (Fed. Cir. 1994).

tor who is first-to-conceive, but last to reduce his invention to practice.[18]

As of this writing, the proposal to switch to a first-to-file system is not included in the patent legislation being considered by Congress.[19] In the past, each time the change has been proposed it has been defeated. For political reasons, it seems likely that years will pass before a first-to-file system is adopted in the United States.[20] This Article will therefore start with the premise that the United States will retain its first-to-invent system, at least for the foreseeable future. I will, however, propose that the current definition of first-to-invent is needlessly complicated and inefficient. Using a utilitarian approach, with an emphasis on economic analysis,[21] I will demonstrate that by re-defining first-to-invent to be synonymous with first-to-reduce-to-practice, the U.S. patent system will achieve greater efficiency without sacrificing the nation's creative spirit.

Working through the current definition of first-to-invent will necessarily require consideration of the other, related concepts, like conception, diligence, and reduction to practice. The interplay of the fundamental concepts under the current doctrine betrays some theoretical conflict among the rules. Given the historical genesis of the rules, this is perhaps unsurprising. From the larger view, in fact, the development of the current doctrine suggests that the incremental approach of the common law to the development of legal rules can be a process of gradual

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18. 35 U.S.C. 102(g) (1994). *See* RasterOps v. Radius, Inc., 861 F. Supp. 1479, 1490-01 (N.D. Cal. 1994) (listing questions for trier of fact to resolve in a priority dispute). For a general discussion of the priority rules, see 3 DONALD S. CHISUM, CHISUM ON PATENTS §§ 10.01-10.09 (1998).

19. *See* H.R. 400, 104th Cong. (1996).

20. Although the opposition to the switch is perennially ferocious, it seems likely that in the end the United States will join the rest of the world in using a first-to-file system.

21. *See, e.g.*, A. Samuel Oddi, *Un-Unified Economic Theories of Patents— The Not-Quite-Holy Grail*, 71 NOTRE DAME L. REV. 267 (1996); Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247 (1994); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990); Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813 (1984); Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305 (1992). *See also* A. MITCHELL POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS (1983); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW (2d ed. 1977).

loss of touch with the policies the law originally sought to promote.

## II. BACKGROUND

### A. *The Current Rules*

*1. The Basic Outline.*—In the United States, the modern definition of "first to invent" is a rather complicated affair. Under current doctrine, "conception" is the most highly prized creative act. The law defines conception as the time when the inventor has completely formulated and disclosed the idea for her invention.[22] In contrast, the law views actual reduction to practice as a process of construction, requiring no more than ordinary skill in the art, through which the conception is made a physical reality. In fact, by definition a "conception" must be sufficiently complete so that a person with ordinary skill in the art can reduce the invention to practice without undue further experimentation.[23] On the other hand, the cases also recognize that reduction to practice is necessary to show that the invention works.[24] The doctrine further provides that filing a patent application constitutes constructive reduction to practice.[25] These corollaries to the main doctrine call into question its purpose and its wisdom.

The complications extend still farther. As already stated, as

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22. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) ("Conception is the 'formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.'" (quoting 1 ROBINSON ON PATENTS 532 (1890))). *See also* CHISUM, *supra* note 18, § 10.04 at 10-73.

23. CHISUM, *supra* note 18, § 10.04 at 10-77 (citing Sewall v. Walters, 21 F.3d 411 (Fed. Cir. 1994) (person having ordinary skill in the art could construct without undue research or experimentation)).

24. *See* Burroughs Welcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1228 (Fed. Cir. 1994); Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed Cir. 1986). *See also* CHISUM, *supra* note 18, § 10.06 (describing actual reduction to practice).

25. *See generally* CHISUM, *supra* note 18, § 10.05 (describing constructive reduction to practice). *See also* Hazeltine Corp. v. United States, 820 F.2d 1190, 1196 (Fed Cir. 1987); Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986); Standard Oil Co. v. Montedison, S.p.A., 664 F.2d 356, 362-63 (3d Cir. 1981).

a general rule the first inventor is deemed to be the person who first reduces an invention to practice, constructively or actually. There is, however, an important caveat to the general rule. If another inventor "conceived" the idea first,[26] then that first inventor may still lay claim to the patent, even though she did not reduce the idea to practice first. Conception means the inventor developed the idea to a point where a "person having skill in the art" could make a working model (reduce the idea to practice) without undue, additional experimentation.

In order to preserve her right to the patent, however, the first conceiver[27] must have worked diligently to reduce the idea to practice from a time preceding the date when the first reducer conceived the idea, until such time as the first conceiver also reduces the idea to practice.[28] The following time line illustrates the relevant time periods:

Inventor A conceives the idea.
Inventor A begins diligent work toward RTP.
Inventor B conceives.
Inventor B reduces the idea to practice.
Inventor A reduces the idea to practice.

In this scenario, Inventor A receives the patent, because A began diligent work prior to the date that B conceived the same idea. If B had conceived the idea before A began diligent work,

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26. Conception requires not only that the conceiver have a fully formed mental formulation of the invention, but further requires that the conceiver disclose the idea to someone else, to corroborate the time of conception. *See* Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1577 (Fed. Cir. 1996). The rules for proving conception and reduction to practice, with appropriate corroboration, can be hard on litigants. *See, e.g.*, Weisner v. Weigert, 666 F.2d 582 (C.C.P.A. 1981).

27. To avoid cumbersome repetition, this Article will adopt the following shorthand references: The first person to conceive of an invention will be termed the "first conceiver." The first person to reduce an invention to practice will be the "first reducer." Any time this Article discusses either a first conceiver or first reducer, it necessarily follows that the person discussed is not both the first conceiver and first reducer. If she were, there would be no priority contest. "Inventor" will refer to the person entitled to a patent for the invention being discussed.

28. 35 U.S.C. § 102(g) (1994); Standard Oil Co. v. Montedison, 664 F.2d 356, 362-63 (3d Cir. 1981). *See also* Marconi Wireless Tel. Co. v. United States, 320 U.S. 1, 34-35 (1943). *See, e.g.*, Fujikawa v. Wattanasin, 93 F.3d 1559, 1562-63 (Fed. Cir. 1996) (in priority dispute, foreign inventor did not challenge diligence of competitor, required only between filing date of foreign inventor's patent and the date of RTP by the U.S. inventor—foreign acts did not count during relevant time period, so foreign inventor was obligated to rely on filing date to establish RTP).

or if A's diligence had lapsed at any time before A reduced the idea to practice, then B would receive the patent, as the first inventor to reduce the idea to practice. Thus, the rules require not only an inquiry into the relevant dates, but also into whether A's efforts were "diligent" throughout the relevant time period.

It is important to note that the two conceptions must be independent. The second conceiver/first reducer must conceive and develop the idea herself. If she appropriates the idea from the first conceiver, then she has no rightful claim to the patent.[29]

*2. Reduction to Practice.*—The current doctrine betrays some ambivalence about the reduction-to-practice requirement. Reduction to practice can be either actual or constructive. Definitionally, actual reduction to practice is merely a mechanical process of creating a working model of the previously complete conception. Constructive reduction occurs with the filing of the patent application.[30] The definitions treat reduction to practice as so minor a part of the inventive process that one may fairly wonder why it is part of the definition of first to invent at all. The matter, however, is not that simple.

"[A]ctual reduction to practice (RTP), which constitutes in law the final phase of invention, cannot be established absent a showing of practical utility."[31] The invention need not be commercially ready for the market, but it must at least be demonstrably functional.[32] RTP may be based on a crude model, leaving further development necessary for commercial use.[33] The

29. *See, e.g.*, American Optical Corp. v. Pittway Corp., 19 U.S.P.Q.2d 1789 (E.D.N.Y. Feb. 22, 1991).

30. Hazeltine Corp. v. United States, 820 F.2d 1190, 1196 (Fed. Cir. 1987).

31. *Fujikawa*, 93 F.3d at 1563 (citing *Blicke v. Treves*, 241 F.2d 718, 720-21 (C.C.P.A. 1957)). *Fujikawa* also highlights the need for a court to determine whether an invention has been suppressed or concealed in priority disputes. If the first inventor is not the first filer, the first filer will undoubtedly allege suppression. *See id.* at 1566-67.

32. *See* Piher Sociedad Anonima v. CTS Corp., 210 U.S.P.Q. 806, 808 (N.D. Ind. 1981).

33. *Id.* at 809 ("once a device has been built and found to perform its intended function, it is reduced to practice and the fact that further experimentation and refinement is deemed necessary for the device to reach its full potential is of no consequence").

legal standard is merely whether the tests performed on the model were sufficiently successful to convince a person having ordinary skill in the art that the invention would work as designed.[34] The model may be flawed, so long as the flaws are not "fundamental," and can be cured by "ordinary mechanical skill."[35] The determination of reduction to practice was recently described by the Federal Circuit as a matter of "common sense."[36] The ultimate test is whether the RTP shows that the invention will "work as intended in its contemplated use."[37]

Accepting the patent application as a constructive reduction to practice follows from the enablement requirement in the application: The application must disclose the idea sufficiently so that a person having ordinary skill in the art could build the invention from the information contained in the application.[38] The enablement definition thus tracks the conception definition; it logically follows that if we accept the possibility that an invention can be completed in the abstract, a properly enabling application should constitute constructive reduction to practice.[39] In 1930, the U.S. District Court in Delaware declared that reduction to practice need no longer be "a matter of construction, building, trial, but the disclosure of the idea by any means—device, drawing, or verbal description—which will enable one skilled in the art to make and use the same."[40] The court's formulation does not appear in later decisions, but its

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34. *Id.*

35. *Id.* at 822. *See also In re* Theis, 610 F.2d 786, 794 (C.C.P.A. 1979) (rejecting the argument that an invention does not exist during the period the invention is not yet operative because it has not yet been reduced to practice when the reason for inoperability is not directly related to the invention).

36. Scott v. Finney, 34 F.3d 1058, 1062 (Fed. Cir. 1994) (quoting Gordon v. Hubbard, 347 F.2d 1001, 1006 (C.C.P.A. 1965)).

37. *Id.* (quoting Eastern Rotocraft Corp. v. United States, 384 F.2d 429, 431 (Ct. Cl. 1967)).

38. 35 U.S.C. § 112 (1994). *See* Scripps Clinic & Research Foundation v. Genentech, Inc., 927 F.2d 1565, 1571 (Fed. Cir. 1991); *In re* Bruchner, 929 F.2d 660, 661 (Fed. Cir. 1991).

39. In *Burroughs Wellcome Co. v. Barr Lab., Inc.*, 40 F.3d 1223, 1231 (Fed. Cir. 1994), the Federal Circuit denied that the enablement and conception standards are identical, and stated that an inventor could prove conception without meeting the enablement standard. Enablement, in theory, must encompass a demonstration that the invention will work, which according to the Federal Circuit is unnecessary for conception.

40. Harper v. Zimmerman, 41 F.2d 261, 266 (D. Del. 1930).

distillation of the reduction to practice requirement into the equivalent of what we call "conception" made sense theoretically.

Actual reduction to practice, however, has long embodied the realization that until a working model is created, the idea may not work. The intent of the statute was to guard against defeating patents by the setting up of a prior invention, which had never been reduced to practice. If it were the mere speculation of a philosopher or a mechanician, which had never been tried by the test of experience, and never put into actual operation by him, the law would not deprive a subsequent inventor, who had employed his labor and his talents in putting it into practice, of the reward due to his ingenuity and enterprise.[41] The modern view of RTP still sees it as a mechanism to show that the invention works. "[A]n inventor need not know that his invention will work for conception to be complete. . . . [T]he discovery that an invention actually works is part of its reduction to practice."[42]

RTP not only shows that an idea works, but it also establishes concretely the contours of the conception. "Conception" has not always neatly connected to the device reduced to practice. For example, in *Marconi Wireless Telephone Co. v. United States*,[43] a flurry of patents were filed by several inventors for various improvements on wireless communication technology, all around the turn of the century. Over forty years later, with the benefit of panoramic hindsight, the Supreme Court tried to sort out an extensive infringement litigation.[44] The majority upheld the patent of one of Marconi's competitors, on the basis of an early application that had been amended several times, including some amendments after Marconi's application. An outraged dissent could flatly state that "Stone's amendment was not supported by anything in his original application and

41. Bedford v. Hunt, 3 F. Cas. 37, 38 (C.C.D. Mass. 1817) (No. 1217).

42. *Burroughs Wellcome*, 40 F.3d at 1228. *See also* Fonar Corp. v. General Elec. Co., 902 F. Supp. 330, 346 (E.D.N.Y. 1995), *aff'd in part and rev'd in part*, Fonar Corp v. General Elec. Co., 107 F.3d 1543 (Fed. Cir. 1997).

43. 320 U.S. 1, 34-35 (1943).

44. *See id.* at 60-63 (Frankfurter, J., dissenting) (criticizing the Court for discounting in retrospect Marconi's inventive contribution as having been anticipated by prior work, where none of Marconi's predecessors were able to reach the insight that Marconi did). *See also id.* at 64-67 (Rutledge, J., dissenting) (expressing similar criticisms of the Majority opinion).

should not have been allowed."[45] The Majority in *Marconi* traced Stone's conception back to 1899, the year before his application, and found that he had disclosed his conception to his class at MIT in January 1900, the month before he filed his patent application.[46] Marconi did not file the relevant patent application until November 1900.[47] The key to the case, however, was only in part the date of conception. The more important issue was the scope of Stone's conception. The Majority opinion found that the concepts eventually incorporated in Stone's amendments were implicit in his original application.[48] Three dissenting Justices did not agree.

The high arts of claim drafting and claim construction are topics for another day. The point here is that even after an inventor builds a working model or files a patent application, the scope of his claimed invention remains open to interpretation. By permitting the inventor to prove his "conception" before even getting that far, perhaps on the basis of his inventor's notebooks or even the testimony of friends, the interpretational playing field is wide indeed.

*3. Conception.*—Conception is enshrined in modern, U.S. patent law as the hallmark of invention.[49] Conception requires the "complete performance of the mental part of the inventive act."[50] The idea must be sufficiently complete so that "a person skilled in the art [could] reduce the conception to practice without any further research or exercise of the inventive skill."[51] The Federal Circuit recently explained: "Conception exists when

45. *Id.* at 80 (Rutledge, J., dissenting).

46. *Id.* at 31-33.

47. *Id.* at 16-18. Marconi had several other patents in the same general field.

48. *Marconi Wireless*, 320 U.S. at 28.

49. Burroughs Wellcome Co. v. Barr Lab., Inc., 40 F.3d 1223, 1227 (Fed. Cir. 1994) ("touchstone of inventorship"); Sewall v. Walters, 21 F.3d 411, 415 (Fed. Cir. 1994) ("Conception, and consequently inventorship, are questions of law"); Rex Chainbelt, Inc. v. Borg-Warner Corp., 477 F.2d 481, 487 (7th Cir. 1973) ("primary date to establish is that of conception").

50. Mergenthaler v. Scudder, 11 App. D.C. 264, 276 (D.C. Cir. 1897).

51. Land v. Dreyer, 155 F.2d 383, 387 (C.C.P.A. 1978). *See also* Boyce v. Anderson, 451 F.2d 818, 821 (9th Cir. 1971) (finding that a junior party had not proven either conception of invention or reduction to practice prior to the senior party); Townsend v. Smith, 36 F.2d 292, 295 (C.C.P.A. 1929) ("invention is made sufficiently plain to enable those skilled in the art to understand it").

a definite and permanent idea of an operative invention, including every feature of the subject matter to be patented, is known. Conception is complete when one of ordinary skill in the art could construct the apparatus without unduly extensive research or experimentation."[52]

Thus, if an inventor continues to experiment beyond the alleged date of conception, those experiments may negate the alleged, earlier date.[53] The distinction is between refinement of the idea and completion of the conception. An inventor is permitted, even encouraged, to refine an idea before filing a patent application, but cannot claim an earlier date of conception if she continued to work out the fundamentals of the conception.[54] Recent cases tell us that the inventor need not know the invention will work to show conception.[55] On the other hand, "proof of conception requires showing that every limitation of the claim was known to the inventor at the time of conception."[56]

The time of conception cannot be proved unless it is corroborated by evidence other than the inventor's own testimony.[57] The evidentiary value of this requirement is obvious. Without the corroboration requirement, there would be nothing to prevent the unscrupulous inventor from concocting evidence to support a non-existent, early conception of the invention at issue.[58] The corroborative evidence fixes the legally recognized

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52. *Sewall*, 21 F.3d at 415 (citation omitted).

53. *See, e.g.*, Bac v. Loomis, 252 F.2d 571, 577 (C.C.P.A. 1958)

> [A] certain amount of selection of sizes, parts, materials, etc., along predetermined lines does not necessarily negative a complete conception of an invention, but where, as here, an elaborate program of research, experimentation and design of parts is necessary before an operative apparatus can be produced, it cannot properly be said that a complete conception . . . has been attained.

54. *See* Mahurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1577-78 (Fed. Cir. 1996).

55. *See Burroughs Wellcome*, 40 F.3d at 1228.

56. Brunswick Corp. v. United States, 34 Fed. Cl. 532, 584 (Fed. Cl. 1995).

57. *Mahurkar*, 79 F.3d at 1577; *Burroughs Wellcome*, 40 F.3d at 1230; Maxwell v. K Mart Corp., 880 F. Supp. 1323, 1329 (D. Minn. 1995) (inventor's testimony alone cannot meet clear and convincing burden of proof). *See also* Casco Products Corp. v. Zaiger, 15 F. Supp. 1014, 1016-17 (D. Mass. 1936) (asserting that the invention cannot go back to the earliest mental conception).

58. *See* Harper v. Zimmerman, 41 F.2d 261, 265 (D. Del. 1930)

> To allow inventions to date from mental conceptions wholly unrecorded and having no existence outside the mind of the inventor would not only 'strongly tempt inventors to commit perjury . . . ' but would, as well, give value to

date of conception.[59]

From a theoretical standpoint, however, the additional burden on the inventor further calls the doctrine into question. To maintain her claim to an early conception, the inventor must develop some independent proof, other than her own testimony to show when she conceived the idea. If she chooses to share her ideas with a third party to meet her evidentiary obligation, she potentially compromises a trade secret, which is a popular alternative to patents for protecting ideas.[60] She may, however, choose another method that does not involve providing actual knowledge to another person. For example, the inventor might deposit sealed envelopes containing full disclosures with an agent, who dates and retains them, but agrees not to examine their contents.

In either scenario, however, the inventor's labors are increased. More important, however, is the need for a relatively sophisticated understanding of the patent priority laws in order to receive the alleged advantages of the system.[61] Supporters of the current system often cite the need to protect the work of the small inventor from the more powerful, corporate research departments. The benefits of the first-to-invent system, however, can only be claimed by someone with the knowledge and resources to maintain an evidentiary system to support her inventive work.

*4. Diligence.*—A party who conceives first, but reduces to practice last (the "first conceiver"), must demonstrate "diligence" during a time period beginning before the other party's conception and extending through the date of her own reduction to practice.[62] Diligence does not require constant work. The first conceiver can maintain diligence while working on other pro-

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> conceptions that had not been reduced to a state in which they could possibly be of service to mankind. A gentler view of the danger sees the potential for self-interest to color unconsciously the memory of the honest inventor.

*See Mahurkar*, 79 F.3d at 1577.

59. *Harper*, 41 F.2d at 266.

60. *See* Daniel C. Munson, *The Patent-Trade Secret Decision: An Industrial Perspective*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 689 (1996).

61. *See generally infra* section III(A).

62. *See* MAURICE H. KITZMAN, PATENT INTERFERENCE LAW & PRACTICE 39-50 (1984).

jects, taking vacations, or otherwise failing to pursue reduction to practice.[63]

The first conceiver, however, must justify any periods during which she did not work on the project.[64] As an evidentiary matter, the first conceiver may not rely solely on her own testimony to establish diligence. She must present corroborative evidence to establish her activities during the relevant time period. Diligence is a factual determination, made on a case-by-case basis.[65] The fact-finder should consider "the nature of the invention, the situation of the inventor, the length of time intervening between conception and reduction to practice, the character and reasonableness of the inventor's testimony and that of his witnesses."[66]

Neither is the same level of diligence required between the time the first conceiver reduces the idea to practice and the time she files her patent application.[67] A delay in filing after reduction to practice is analyzed in terms of "suppression" rather than "diligence." In other words, the issue is whether the inventor actually suppressed or concealed the invention, rather than whether she continued to work on it diligently.[68]

To amount to a loss of right to a patent in favor of a latter

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63. Quad Six, Inc. v. Hall, 5 U.S.P.Q.2d 1700, 1707-08 (S.D. Tex. 1987) (inventor with full-time job satisfied diligence requirement working in spare time); Gould v. Schawlow, 363 F.2d 908, 919 (C.C.P.A. 1966) (inventor need not give up livelihood); Brown v. Barton, 102 F.2d 193, 197 (C.C.P.A. 1939) ("well-established" that periods of inactivity may be excused).

64. *In re* Nelson, 420 F.2d 1079, 1081 (C.C.P.A. 1970). *See also* Litchfield v. Eigen, 535 F.2d 72, 76-77 (C.C.P.A. 1976) (alleged budgetary problems insufficient to excuse several months delay in work).

65. *See, e.g.*, Gregg v. Coakwell, 175 F.2d 575, 579 (C.C.P.A. 1949).

66. *Gregg*, 175 F.2d at 579 (quoting Callaghan v. Couverneur, 295 F. 961, 964 (App. D.C. 1924)).

67. *See, e.g.*, Calderon Automation, Inc. v. GMC, 206 U.S.P.Q. 782, 787 (E.D. Mich. 1980) (two and one-half year delay between RTP and filing was not suppression). According to *Calderon*, the law actually encourages inventors to take the time to conduct additional tests to assess the commercial value of an invention before filing for a patent. *Id.*

68. 35 U.S.C. § 102(g) (1994). *See* Paulik v. Rizkalla, 760 F.2d 1270, 1273 (Fed. Cir. 1985) (renewed activity to prepare patent application before competitor began work on development of the same invention prevented finding of suppression or concealment despite RTP several years earlier). Suppression or concealment should be distinguished from "abandonment," 35 U.S.C. § 102(c), which occurs when the inventor effectively donates the invention to the public. *See* Piher Sociedad Anonima v. CTS Corp., 210 USPQ 806, 810 (N.D. Ind.), *aff'd*, 664 F.2d 122 (7th Cir. 1981).

inventor, suppression or concealment must be deliberate or intentional.[69] However, excessive or unreasonable delay gives rise to an inference of intent to suppress or conceal, and the burden shifts to the first inventor to explain the delay by showing that there was no intent to suppress or conceal.[70] Delay may be excused by activities of the inventor or her assignee during the delay period.[71] Activity directed toward perfecting an invention justifies delay in filing a patent application.[72]

*5. The Potential for Paradox.*—The interplay of these rules can create some paradoxical results if there are more than two independent conceivers. In fact, in cases of three or more independent conceivers, it is possible for the outcome of the rules to be absolutely indeterminate.[73] Chisum provides the following example.[74] Consider three inventors, A, B, and C, working on the same invention on the following time line:

A conceives the idea.
B conceives.
A commences diligent work toward reduction to practice.
C conceives.
B commences diligent work toward RTP.
C reduces the idea to practice.
B reduces the idea to practice.
A reduces the idea to practice.

If we simply apply the existing first-to-invent rules woodenly, then no determination of the first inventor is possible. B would prevail over A, because B reduced the idea to practice first, and A did not commence diligent work until after B conceived. C would prevail over B for the same reason. Yet A would prevail over C, because A was first to conceive, and A did begin diligent

69. *Piher*, 210 U.S.P.Q. at 824 (quoting Board).
70. *Id.*
71. *Id.*
72. *Id.*
73. This idea originated with Hoar, *An Anomalous Doctrine*, 13 J. PAT. OFF. SOC'Y 655 (1931). *See also* Richard H. Stern, *Priority Paradoxes in Patent Law*, 16 VAND. L. REV. 131 (1962); Thomas M. Ferrill, Jr., *An Anomalous Situation in the Law of Interferences as Applied to Multi-Party Cases*, 33 J. PAT. OFF. SOC'Y 457 (1951). For another abbreviated discussion of the concept, see CHISUM, *supra* note 18, § 10.03 at 10-35 & 10-45.
74. CHISUM, *supra* note 18, § 10.03[2].

work before C conceived. The commentators have suggested a number of solutions. The patent could be awarded to the first of the trio to file an application. It could be awarded to C, as the first inventor to reduce the idea to practice. It could be awarded to A, as the first inventor to conceive the idea. B could be eliminated as the least attractive alternative—B accomplished none of the steps first, then the standard rules could be applied to award the patent to A.

Perhaps the most appealing suggested alteration to the existing rules is to redefine the period of diligence. Rather than requiring that diligence commence before the second conception, the rule could be altered to simply require that the inventor commence diligent work before the second conceiver commences diligent work.[75] One might also defensibly maintain that no patent should be awarded at all.[76]

The potential for paradox, of course, does not mean that it happens often. When evaluating the soundness of the doctrine, however, the potential for paradox suggests that the doctrinal structure is flawed. A fundamental premise of liberal legal theory states that we are ruled by laws, not subject to the discretionary whims of men.[77] A doctrine that contains a long recognized potential to fail suffers a need for change, or at least for some new justification.

### *B. The Historical Genesis of the Current Rules*

The current rules were not fully articulated until the late 1890s, after the courts had struggled to interpret the Patent Act of 1836 for several decades.[78] Prior to 1836 in fact, there was little or no statutory guidance for resolving patent priority disputes between independent inventors. The British system, from which the United States borrowed much of its early doctrine, denied a patent to both inventors when it faced a case of inde-

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75. CHISUM, *supra* note 18, at 10-47 (citing *Grabowsky v. Gallaher*, 39 App. D.C. 548 (1913) (rejecting that contention)).

76. *Cf.* Lassman v. Brossi Gerecke & Kyburz, 159 U.S.P.Q. 182, 185 (Pat. Off. Bd. of Pat. Interferences 1967) (denying patent to both inventors where reduction to practice was simultaneous).

77. *See* Frank Michelman, *Law's Republic*, 97 YALE L.J. 1493, 1493 (1988).

78. *See* CHISUM, *supra* note 18, § 10.02.

pendent, relatively simultaneous invention.[79] The no-patent rule in Britain resulted from the British statute's definition of "originality." In Britain, originality was determined on the date the patent was *issued*. Therefore, if applications for the same invention were in the system at the same time, then neither was original on the date of determination, and neither inventor was entitled to a patent.[80] As a result, British law offered no guidance for the resolution of priority disputes.[81]

When the United States enacted its first Patent Act in 1790, Congress debated a special mechanism for resolution of patent priority disputes.[82] Ultimately, however, the law left resolution of patent priority to the federal courts.[83] Again in 1793, no administrative provision was made.[84] Nor did either act offer any guidance regarding the meaning of the phrase "first and true inventor." Walterscheid offers a fairly persuasive theory as to how the statute came to be so vague.

*1. Walterscheid's Steamboat Patent Race Theory.*—Prior to 1790, the states had each developed separate patent systems.[85] "By 1787, . . . granting of state patents was at a peak, and the need for a centralized system was strongly indicated by the multiple applications of competing inventors."[86] The result of this pressure is well-known; the U.S. Constitution provides Congress the power to "promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the

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79. Walterscheid, *supra* note 1, at 269.

80. Walterscheid, *supra* note 1, at 269.

81. Walterscheid, *supra* note 1, at 269.

82. 1 Stat. 109, 111 (1790) (First Cong., Sess. II, Ch. VII, § 6) (approved Apr. 10, 1790). *See* Walterscheid *supra* note 1, at 285-86 (first patent bill provided for jury determination of "first and true inventor"). Walterscheid suggests that the drafter of the first patent bill likely was aware of the steamboat patent competition among the states, and was responding to the political nature of the state contests. Walterscheid *supra* note 1, at 286.

83. 1 Stat. 109, 111 § 5 (1790). Curiously, Walterscheid concludes that the Act contained no mechanism for the resolution of priority disputes. *See* Walterscheid, *supra* note 1, at 290-91. The plain language of the Act, however, assigns patent disputes to the district courts.

84. Act of Feb. 21, 1793, ch. 11, 1 Stat. 318.

85. *See* Walterscheid, *supra* note 1. *See also* BRUCE W. BUGBEE, GENESIS OF AMERICAN PATENT & COPYRIGHT LAW 84-103 (1967).

86. BUGBEE, *supra* note 85, at 103.

exclusive Right to their respective Writings and Discoveries."[87] In the past, some have argued that the U.S. first-to-invent system is constitutionally mandated by this language.[88]

As Walterscheid points out, however, there is no historical support for that contention. At the time of the framing, the term "first and true inventor" was unquestionably not understood to mean only the creator of the invention. On the contrary, "first and true inventor" as understood under the English Statute of Monopolies included a person who introduced to England an invention previously used in another country.[89]

Walterscheid attributes the early development of a distinctive U.S. patent system to the turmoil caused by multiple state patent acts under the Articles of Confederation, and their efforts to respond to the Rumsey-Fitch steamboat patent competition.[90] Perhaps the first patent interference proceeding ever in this country took place in Pennsylvania in 1786, between Fitch and a new competitor, Arthur Donaldson.[91] The proceedings were notable for the arguments made by Fitch, who cited the Statute of Monopolies to contend that he deserved the patent as the "first and true inventor."[92] The English understanding of "first and true inventor" was not discussed, and the Pennsylvania legislature applied the language literally to find that Fitch should receive the patent.[93]

Rumsey had earlier obtained a patent for a "streamboat" in Pennsylvania and Virginia.[94] Fitch used his Pennsylvania patent to oppose Rumsey successfully in Virginia, convincing Virginia that Rumsey's patent covered a different invention, but

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87. U.S. CONST. art. I, § 8.

88. *See, e.g.*, Walterscheid, *supra* note 1, at 282 n.52 and accompanying text (discussing early argument that patents of importation would be unconstitutional).

89. *See* Walterscheid, *supra* note 1, at 280-83. *See also* Edward Armitage, *Two Hundred Years of English Patent Law, in* 200 YEARS OF ENGLISH & AMERICAN PATENT, TRADEMARK & COPYRIGHT LAW 3, 13-14 (ABA 1976); HAROLD G. FOX, MONOPOLIES & PATENTS: A STUDY OF THE HISTORY AND FUTURE OF THE PATENT MONOPOLY 230-31 (1947).

90. Walterscheid, *supra* note 1, at 269-70. For another description of the steamboat struggle, see Frank D. Prager, *The Steamboat Interference 1787-1793*, 40 J. PAT. OFF. SOC'Y 611 (1958) [hereinafter *Steam Boat*].

91. Walterscheid, *supra* note 1, at 273-74.

92. Walterscheid, *supra* note 1, at 274.

93. Walterscheid, *supra* note 1, at 274.

94. Walterscheid, *supra* note 1, at 271.

Rumsey prevailed and received a patent in Maryland.[95] Fitch also obtained patents in New Jersey, Delaware and New York.[96] In Pennsylvania, Rumsey and Fitch battled again, but somehow the issues mutated into whether Fitch had a right to "improve" Rumsey's design. The Pennsylvania legislature left both patents intact.[97] According to Walterscheid, the state battles offer two lessons: 1) the states were predisposed to award the patent to the "first inventor"; and 2) once a patent was issued they were inclined to let it stand, even if it had been issued in error.[98]

The first bill introduced to establish a U.S. patent system contained a provision to resolve priority disputes by having a jury determine the "first and true inventor."[99] Walterscheid theorizes that the provision was a response to the highly political competition for the steamboat patents among the states.[100] Another commentator, Frank Prager notes that at least two provisions in the 1790 Act were entirely new to patent law, and were promoted by Fitch and opposed by Rumsey: 1) the distinction between new inventions and improvements on existing inventions, and 2) the requirement that the patent applicant disclose his idea to the public.[101] Congress did not enact the bill for procedural reasons, and the priority resolution provision was deleted from the second bill, on the ground that juries were not competent to resolve patent issues.[102] Instead, the House passed a bill providing for the resolution of priority disputes by the Secretary of State, with appeal to a three-member panel.[103] That provision was deleted by the Senate, leaving no mechanism at all for priority dispute resolution.[104]

Without explicit statutory direction for resolving patent priority disputes, the Patent Board considered adopting a first-

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95. Walterscheid, *supra* note 1, at 276-77.
96. Walterscheid, *supra* note 1, at 272.
97. Walterscheid, *supra* note 1, at 278-79.
98. Walterscheid, *supra* note 1, at 279-80.
99. Walterscheid, *supra* note 1, at 283-85. *See also* H.R. 10, 1st Cong. 2d Sess. 1790.
100. Walterscheid, *supra* note 1, at 286.
101. Prager, *Steam Boat*, *supra* note 90, at 631.
102. Walterscheid, *supra* note 1, at 286-88.
103. Walterscheid, *supra* note 1, at 288.
104. Walterscheid, *supra* note 1, at 290.

to-file system.[105] Why it did not is unclear. The Board may have viewed a first-to-invent system as more inherently fair. It may have been aware of the debates in Congress that would have adopted a first-to-invent system. More likely, however, says Walterscheid, is that the pressure from Fitch and Rumsey to determine which man had priority for the steamboat patent caused the Board to waffle.[106] Ultimately, the Board made no priority determination, and awarded patents to both Fitch and Rumsey, as well as two other petitioners.[107]

By 1791, Congress was already considering revising the Act.[108] A bill presented to the Second Congress in 1792 proposed again a jury trial to resolve priority disputes.[109] The bill eventually enacted replaced the jury trial concept with a three-member arbitration panel. Most significantly, the new law again did not spell out the criteria for resolving the dispute.[110]

As a result, patent practice under the Act of 1793 was a disaster.[111] To the extent there were interference proceedings, the Board tried to ascertain who was the first-to-invent, but there was no definition of what that meant.[112]

*2. The Development of the Doctrine in the Early Cases.*—Left to their own devices, the courts determining priority before the Act of 1836 developed a different view of first-to-invent; they equated it with reduce to practice. In the early case, *Bedford v. Hunt*, Justice Story emphasized the RTP requirement as fundamental to the patent reward: "The first inventor, who has put the invention in practice, and he only, is entitled to a patent."[113] Story's *Bedford* conception of justice, however, would

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105. Walterscheid, *supra* note 1, at 290-91. *See also* P.J. Federico, *Operation of the Patent Act of 1790*, 18 J. PAT. OFF. SOC'Y 237, 248 (1936) (describing the lack of guidance provided in the Patent Act of 1790).

106. Walterscheid, *supra* note 1, at 291-92.

107. Walterscheid, *supra* note 1, at 296.

108. Walterscheid, *supra* note 1, at 301-02. *See also* H.R. 121, 1st Cong. (1791).

109. *See* Walterscheid, *supra* note 1, at 302. *See also* H.R. 166, 2d Cong. (1792).

110. Walterscheid, *supra* note 1, at 305-06.

111. Walterscheid, *supra* note 1, at 311-13. *See also* Daniel Preston, *The Administration and Reform of the U.S. Patent Office, 1790-1836*, 5 J. EARLY REP. 331, 332 (1985) (with whom Walterscheid disagrees at least in part); P.J. Federico, *Early Interferences*, 19 J. PAT. OFF. SOC'Y 761, 763 (1937) (describing the complications caused by the Act 1973).

112. Walterscheid, *supra* note 1, at 319.

113. Bedford v. Hunt, 3 F. Cas. 37, 37 (C.C.D. Mass. 1817) (No. 1217). *See also*

soon be swept aside in favor of the first conceiver.

The basis for change came in 1836 when Congress enacted a new patent law, including an amendment to an existing defense to a claim of patent infringement.[114] An accused infringer could avoid liability by showing that the plaintiff "had surreptitiously or unjustly obtained the patent for that which was in fact was invented or discovered by another, who was using reasonable diligence in adapting or perfecting the same."[115]

Chisum suggests that the current framework traces its genesis to *Philadelphia & Trenton R.R. Co. v. Stimpson*.[116] In *Stimpson*, decided in 1840, Justice Story and the Court addressed an evidentiary question. Stimpson relied on a patent issued in 1831.[117] The railroad proved that the idea had been in use by others as early as 1828, and contended that Stimpson was not the first and true inventor. Stimpson therefore sought to prove that he had invented the improvement prior to 1828, and offered his own testimony and the testimony of two friends to show that he had explained the invention to others prior to 1828, and therefore could tie the date of his invention to that earlier time. At the time, a general rule of evidence excluded "declarations and conversations of a plaintiff . . . in favor of his own rights.[118] An exception to the rule, however, permitted a party to use declarations to prove the res gestae, a doctrine that the Court applied in the inventive context.

> The invention itself is an intellectual process or operation;

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Woodcock v. Parker, 30 F. Cas. 491, 492 (C.C.D. Mass. 1813) (No. 17,971) (Story, J.) ("The first inventor is entitled to the benefit of his invention, if he reduce it to practice, and obtain a patent therefor . . . .").

114. *Compare* Act of July 4, 1836, ch. 357, § 15, 5 Stat. 117, 123, *with* Act of Feb 21, 1793, ch. XI, § 6, 1 Stat. 318, 322 (only substantive change added caveat to defense that patentee had surreptitiously or unjustly obtained the patent for another's invention). *See also* WILLARD PHILLIPS, THE LAW OF PATENTS FOR INVENTIONS 395 (1837).

115. Act of July 4, 1836, ch. 357, § 15, 5 Stat. 117, 123.

116. CHISUM, *supra* note 18, at 10-11 to 10-12. *See* Philadelphia & Trenton R.R. Co. v. Stimpson, 39 U.S. (14 Pet.) 448, 462 (1840). Stimpson alleged infringement of his patent on an improvement to the wheels on trains to permit them to turn tight corners.

117. The patent was declared invalid due to defective specification in the application, but was renewed in 1835. The Court held that Stimpson was entitled to rely on the original, 1831 date. *Id.* at 457-58.

118. *Stimpson*, 39 U.S. at 461.

> and, like all other expressions of thought, can in many cases scarcely be made known, except by speech. The invention may be consummated and perfect, and may be susceptible of complete description in words, a month, or even a year before it can [be] embodied in any visible form, machine, or composition of matter. . . . In short, such conversations and declarations, coupled with a description of the nature and objects of the invention, are . . . legitimate evidence that the invention was then known to and claimed by [the plaintiff.][119]

Thus, the Court imported into an evidentiary question its views on the nature of the inventive act. It offers no citation to support its conclusion, as admittedly was common then, and apparently invented its new definition of invention from whole cloth.[120] In doing so, it apparently lost sight of the prior decisions, which had emphasized reduction to practice. This is particularly curious, given that Justice Story wrote the opinion after writing *Bedford* and *Woodcock* some years before. To the extent that the Court found for Stimpson on the evidentiary issue, that Stimpson could prove his date of invention by his own and his friends' testimony, the decision is untroubling. Stimpson did not even argue that he could "invent" something without reducing it to practice.[121] Rather, he argued that having proved that he had reduced it to practice, he could use oral testimony to prove the *date* that he had done so, a much more modest proposition.[122] In that light, the Court's discussion of the nature of the inventive process, to the extent that it started to change the definition of "invent," was dicta, unnecessary to the outcome, and out of harmony with the established rules.

The following year, in *Heath v. Hildreth*, the Circuit Court for the District of Columbia explained that reduction to practice did not entail actual use.

> None of the patent laws have ever required that the invention

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119. *Id.* at 461-62.

120. There is admittedly the germ of this distinction in some of Story's earlier cases. *See* Woodcock v. Parker, 30 F. Cas. 491, 492 (C.C.D. Mass. 1813) (No. 17,971) ("if the first inventor should wholly abandon his invention and never reduce it to practice, so as to produce useful effects").

121. He did argue that he did not need to put the invention into actual use to be the inventor. *Stimpson*, 39 U.S. at 454-55.

122. *Id.*

> should be in use or reduced to actual practice before the issuing of the patent, otherwise than by a model, drawings, and a specification containing a written description of the invention and of the manner of making, constructing, and using the same in such full, clear, and exact terms as to enable any person skilled in the art to which it appertains to make, construct, and use the same.[123]

According to *Heath*, the "spirit, if not the letter, of the fifteenth section of the act of 1836" dictated its result.[124] According to *Heath*, an inventor ought not be prejudiced by efforts to improve an invention before making it public.[125]

The shift to adopting conception as the hallmark of invention truly commenced, however, with *Reed v. Cutter*,[126] also decided in 1841. Justice Story was riding the circuit, and wrote the opinion for the Circuit Court in Massachusetts, which decided the case. In *Reed*, the court interpreted section 15 of the Act of 1836 to create a caveat to the general rule that the patent went to the first inventor to reduce the invention to practice.

> The clause of the fifteenth section, now under consideration, seems to qualify that right, by providing that, in such cases, he who invents first shall have the prior right, if he is using reasonable diligence in adapting and perfecting the same, although

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123. Heath v. Hildreth, 11 F. Cas. 1003, 1004 (C.C.D.C. 1841) (No. 6309). *Heath* further recognized that to lay claim to "inventor" status, the invention need at minimum be disclosed:

> If the invention be the mere speculation of a philosopher or mechanician in his closet, and he takes no steps toward obtaining a patent, but keeps his invention secret, and another person, who is also an original but subsequent inventor of the same thing, obtains a patent for it and brings it into use, it has been held, both in England and in this country, that the patentee in a suit at law is to be considered as the first inventor.

*Id.* at 1005. The court traced the rule to *Dolland's Case*, an unreported decision discussed in Boulton v. Bull, 2 H. Bl. 463, 464. The court further explicated its view of reduction to practice:

> I do not consider the expression "reduced to practice" as importing the bringing of the invention into use. When applied to an invention, it generally means the reducing it into such form that it may be used so as not to be a mere theory. If a machine be invented and described in such a manner that it may be made and used, and especially if a model be made, the invention may be said to be reduced to practice.

*Id.* at 1006.

124. *Id.* at 1006.

125. *Id.* at 1007.

126. 20 F. Cas. 435 (C.C.D. Mass. 1841) (No. 11,645).

the second inventor has, in fact, first perfected the same, and reduced the same to practice in a positive form. "It thus gives full effect to the well known maxim, that he has the better right, who is prior in point of time, namely, in making the discovery or invention."[127]

The *Reed* Court both misunderstood the statute and failed to see the inherent conflict in the rules it articulated. First, *Reed* misconstrued the 1836 Act. The rules of statutory construction in 1836 were theoretically more limited than those familiar today. "The most venerable aids have been maxims of construction, which are general rules designed to permit reasonable interpretation."[128] Early United States courts followed the English practice of refusing to consider legislative history when interpreting a statute.[129] "[I]ntention is to be searched for in words which the legislature has employed to convey it."[130] American courts in the nineteenth century relied on a strong version of "the Plain Meaning Rule," holding "that the legislative history of the passage of a statute furnishes no rule for its exposition."[131]

Nevertheless, elsewhere in the *Reed* decision, the Court compares the 1790, 1793, and 1836 Acts as an aid in construction.[132] Had it been as diligent in considering the meaning of the diligence caveat, it might well have reached a different result. The critical language of the 1836 Act provided:

> [T]he defendant . . . shall be permitted to plead . . . any special matter in evidence, of which notice in writing may have been given to the plaintiff or his attorney, thirty days before trial, . . . that the patentee was not the original and first inventor or discoverer of the thing patented, or of a substantial and material part thereof claimed as new, or . . . that [the plaintiff] surreptitiously or unjustly obtained the patent for that which was in fact invented or discovered by another, *who was using reasonable*

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127. *Id.* at 438. At issue in *Reed* were two patents related to a cast-iron water pump.

128. BERNARD D. REAMS, JR., FEDERAL LEGISLATIVE HISTORIES xii (1994).

129. *Id.* at xiv-xv.

130. *Id.* at xv (quoting Schooner Paulina's Cargo v. United States, 11 U.S. (7 Cranch) 52, 60 (1812)).

131. *Id.* (quoting Proprietors of the Charles River Bridge v. Proprietors of the Warren Bridge, 36 U.S. 420, 469 (1837)).

132. *Reed*, 20 F. Cas. at 438.

*diligence in adapting and perfecting the same . . . .*[133]

Justice Story treated that provision as something new in the 1836 Act, which created an exception to the existing reduction to practice equals invention rule.[134] *But almost the same language can be found in both the 1790 and 1793 Acts.* The 1790 Act had empowered the district courts to repeal any patent that "was obtained surreptitiously by, or upon false suggestion," or to repeal a patent "if it shall appear that the patentee was not the first and true inventor or discoverer."[135] Similarly, the 1793 Act provided that an accused infringer could affirmatively defend *inter alia* by showing that the invention at issue "was not originally discovered by the patentee" or "that [the patentee] had surreptitiously obtained a patent for the discovery of another person."[136] The 1793 Act further provided for the district courts to repeal patents on the same grounds.[137] The only new language in the 1836 Act provided that the defense did not apply if the person from whom the patentee allegedly derived the idea was not working diligently on perfecting the invention. The amendment thus reduced the scope of the defense, not enlarged it. A direct comparison with the prior acts suggests that the legislative intent was to ensure that ideas were brought to the public good. The law intended neither to punish industry nor to reward sloth.

From a plain language standpoint, the key is that the two defenses are separate. An accused infringer could *either* show that the plaintiff was not the first and true inventor—i.e., someone else invented it first, *or* the accused infringer could show that the plaintiff had surreptitiously and unjustly obtained the patent—i.e., the plaintiff had stolen the idea from someone else. If the provisions were not intended to express separate rules, then the second clause, which penalized surreptitious and unjust conduct, would be mere surplusage. Arguably, that provision would be encompassed in the first statement, which required

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133. Act of July 4, 1836, § 15, 5 Stat. 123 (emphasis added).

134. *Reed*, 20 F. Cas. at 438. Interestingly, Chisum also accepts the language of the 1836 Act as being somehow novel in comparison to the previous two acts. *See* CHISUM, *supra* note 18, § 10.2(b).

135. Act of Apr. 10, 1790, ch. VII, § 5 (1st Cong., 2d Sess.), 1 Stat. 109, 111.

136. Act of Feb. 21, 1793, ch. XI, § 6 (2d Cong., 2d Sess.), 1 Stat. 318, 322.

137. *Id.* § 10, 1 Stat. 323.

that the patent go only to the original and first inventor. A person who acquired a patent by stealth would not be the original and first inventor.

The diligence qualification in the 1836 Act merely provided that taking an idea from someone who was not working toward bringing the invention to the public good was not stealing. That provision would be entirely consonant with the purposes of the Act—to encourage the progress of the arts and sciences, and to bring creative work to the public benefit. To lay claim to the title, "inventor" one must bring an idea to completion, not simply generate unfinished possibilities, or keep finished ideas to herself. The provision in truth appears to have been intended to deal with cases that today would be handled as "suppression" cases, in which the inventor intentionally conceals her invention from the public.

One must also remember that at the time it was well-settled that "invent" meant "reduce to practice."[138] Story's interpretation of the Act of 1836 implicitly changed the definition of first-to-invent. He equated "perfecting" with "reducing to practice," and treated "invented or discovered by another" as meaning that an invention could be recognizable by the patent law prior to reduction to practice.[139] This formulation was almost entirely new, presaged only by Story's previous musings in *Stimpson*.[140]

There is no question that Story was familiar with the law under the prior acts, as he had been a judge for many years at the time of the *Reed* decision.[141] In fact, Story had charged at least one jury some years before on exactly the provision at issue: "As to the question, whether the patent was surreptitiously obtained, there is no direct or positive proof, that Reed had ever seen Perkins's machine before he obtained a patent, but there is evidence, from which the jury may legally infer the fact, if they believe that evidence."[142] Thus, by his own experi-

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138. *See, e.g., Bedford*, 3 F. Cas. at 37-38.

139. *Reed*, 20 F. Cas. at 438.

140. *Stimpson*, 39 U.S. at 448.

141. *See generally* Prager, *Story's Influence*, *supra* note 14 (tracing Justice Story's experience in and contribution to American patent law).

142. Odiorne v. Winkley, 18 F. Cas. 581, 582 (C.C.D. Mass. 1814) (No. 10,432). *See also* Woodcock v. Parker, 30 F. Cas. 491, 492 (C.C.D. Mass. 1813) (No. 17,971) (instructing jury that plaintiff must be first and true inventor).

ence with the prior Acts, Story should have been aware of the distinction between the two provisions.

Instead, however, Story read the diligence provision to mean that if the provision was "limited to situations of derivation . . . it would be curious indeed to hold that where the first conceiver was not diligent one who derives the invention from the conceiver is in a better position than an independent inventor."[143] He purported to accept the reasoning of Willard Phillips, the author of the leading treatise on patents at the time.[144] But Story either misread or misrepresented Phillips's interpretation of the passage. Phillips in no way revised the definition of "invent." He merely stated that a patentee "shall not be defeated by proof that another person had anticipated him in *making* the invention, unless it also be shown that such person was adapting and perfecting his invention."[145] Phillips in no way offered a new interpretation of "invent."

Story thus committed two errors. He redefined "invent," and he re-interpreted the intent of the statute. Even if we accept Story's distinction between conception and reduction to practice, his application of the statute discourages socially productive work. There will be little argument that if the first conceiver was diligently working toward a full-fledged invention, and an unscrupulous inventor stole the idea and reduced it to practice first, then clearly something unfair has happened. But the idle dreamer who never would have invested the effort to bring an idea to fruition is also being unfair if she lays claim to a patent after she merely recounts an undeveloped, germinal idea to a more motivated inventor who works to develop the idea into a completed invention. Neither is it unfair to reward an inventor who brings an invention to the public use, despite an earlier inventor who was keeping the idea to herself. There is nothing "curious" about a construction of the statute to reward socially productive inventors rather than dreamers and secret-keepers. Rather, society should encourage the more industrious to develop and disclose their ideas.

On the plain language of the statute, as illuminated by the

143. CHISUM, *supra* note 18, § 10.02[2][b].
144. *See Reed*, 20 F. Cas. At 438.
145. PHILLIPS, *supra* note 114, at 395 (emphasis added).

prior two acts, Story should have reached that conclusion. But "Story was uninhibited in interpreting words into and out of this statute."[146] Apparently, Story's habit of legislating patent law from the bench based on his own ideas of morality is often viewed as a good thing.[147] In this case, however, it was not, and Story set in motion the common law machinery that led to the doctrine we have today.[148] "[Story's] views on priority were among the most permanent and also among the most original of the rules of judical law created by Story."[149]

The second and related point is that *Reed* missed the analytical conflict between the right to "perfect" the invention and the general rule of reduction to practice. According to *Reed*, the so-called first "inventor" need not even have perfected his invention. Reduction to practice at this time really was a matter of tinkering with the idea and trying variations to see if it would work, rather than a simple mechanical process requiring no creative input. Nevertheless, Story somehow viewed a person who had a general conception of the invention as having some sort of natural right to the invention. The case betrays no serious analysis of why this should be so. Rather, Justice Story simply assumed that invention and conception were one and the same, an assumption that directly contradicted the prior case law.

*3. Post-*Reed *Doctrinal Development.*—The doctrine never-

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146. Prager, *Story's Influence, supra* note 14, at 254. *Cf.* Prager, *Steam Boat, supra note* 90, at 635 (noting that the Rumsey Steam Boat Interference brief has been lost and might have been the origin of the conception plus diligence theory); *see also* MORTON HORWITZ, THE TRANSFORMATION OF AM. L. 1780-1860 38-39 (1977) (Story transformed riparian law while citing contrary authority to support his new propositions).

147. *See, e.g.*, Prager, *Story's Influence, supra* note 14, at 254. Referring to a different decision: "Certain it is that it was new law under the American statute of Story's time, law interpreted into the statute, not law which could in any way be based on the statute." *Id.* at 257.

148. The "relaxation of [legal] formalism" is hailed by at least one commentator as one of Story's "major achievements." Prager, *Changing Views, supra* note 14, at 2, 8 (referring to a different case—"At least part of the explanation for Story's selective use of canons of interpretation . . . lies in the fact that he then expressly doubted the wisdom of the American statute in imposing a relatively light burden on a patent applicant.").

149. Prager, *Story's Influence, supra* note 14, at 262.

theless gathered steam. Certainly, by 1848 in *Adams v. Edwards*,[150] the type of reasoning that led to the current system was explicit. In charging the jury, the Circuit Court for the District of Massachusetts explained:

> The law means, by invention, not maturity. It must be the idea struck out, the brilliant thought obtained, the great improvement in embryo. He must have that; but if he has that, he may be years improving it—maturing it. It may require half a life. But in that time he must have devoted himself to it as much as circumstances would allow. But the period when he strikes out the plan which he afterward patents, that is the time of the invention—that is the time when the discovery occurs.[151]

The court further instructed, "[t]he question is then presented, on this evidence, did he strike out this idea, which he afterward got patented, as early as 1831, and did he follow it up to 1836, till maturity, and follow it up, too, in various ways, and with reasonable diligence, considering his means?"[152]

In 1853, the Circuit Court for the District of Columbia addressed the issue squarely. Confronted with two original (i.e., independent) inventors, one of whom first conceived and worked diligently toward reduction to practice, and one of whom first reduced to practice, the court awarded the patent to the first conceiver.[153] Counsel for the first reducer emphasized his client's originality, and contended that as an independent inventor, he was not covered by section fifteen of the 1836 Act, which forbade a patent to one who surreptitiously or unjustly acquired a patent while the first conceiver was working diligently to reduce the idea to practice.[154] The court, however, quoted Justice Story's opinion in *Reed* at length and followed the rule that a diligent first conceiver prevails over the first reducer.[155]

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150. 1 F. Cas. 112 (C.C.D. Mass. 1848) (No. 53).

151. *Adams*, 1 F. Cas. at 115. The court so instructed the jury in reference to an affirmative defense to infringement raised by the defendant, i.e., that the plaintiff was not the first and true inventor, but rather a fellow name Fitzgerald was. *Id.*

152. *Id.*

153. Marshall v. Mee, 16 F. Cas. 843 (C.C.D.C. 1853) (No. 9129).

154. *Marshall*, 16 F. Cas. at 844.

155. *Id.* The opinion also, however, finds as a factual matter that the alleged first reducer stole the idea from the first conceiver, so the *Marshall* discussion of the priority rules is actually dicta. *Id.* at 845.

Between 1853 and 1893, several cases solidified the *Reed* conception of the priority rules into settled doctrine. In 1859, the Circuit Court for the District of Columbia again confronted a direct priority dispute in *Dietz v. Wade*.[156] In *Dietz*, the court both addressed the issue as an evidentiary matter, as Justice Story had done in *Stimpson*, and discussed the "principle . . . that necessary time used for the embodiment of the invention ought to be allowed without detriment to its origin as prior in time."[157] According to the court, requiring the inventor to reduce the invention to practice before it could be patentable "would operate unequally, unjustly, and oppressively, and subversive of the good old rule, 'qui prior est in tempore potior est in jure.'"[158] The following year, in *Appleton v. Chambers*,[159] the court again held that an inventor was entitled to a "reasonable time" in which to perfect his invention without sacrificing priority.[160]

*Reed*'s reasoning was again embraced in dicta in *White v. Allen*,[161] where the Circuit Court for the District of Massachusetts addressed an infringement action for the patent to a revolver. The defendants asserted that the plaintiff was not the first and true inventor of the revolver, and alternatively that the invention had been in public use and on sale for more than two years before the plaintiff applied for his patent. The defendants introduced into evidence a Belgium patent, which the Court agreed showed the same design as the plaintiff's.[162] The burden therefore shifted to the plaintiff to show he had invented the revolver prior to the date of the Belgium patent.[163] The patentee testified that he had conceived the idea some eighteen years

156. Dietz v. Wade, 7 F. Cas. 684 (C.C.D.C. 1859) (No. 3903).
157. *Dietz*, 7 F. Cas. at 689.
158. *Id.*
159. 1 F. Cas. 1072 (C.C.D.C. 1860) (No. 4974).
160. *Appleton*, 1 F. Cas. at 1074.
161. 29 F. Cas. 969 (C.C.D. Mass. 1863) (No. 17,535).
162. *White*, 29 F. Cas. at 972.
163. *Id.* The law at this time already held that a patent would issue only to a person who was the first inventor in the world, and not simply in the United States. Reutgen v. Kanowrs, 20 F. Cas. 555, 556 (C.C.D. Pa. 1804) (No. 11,710) ("[I]f it appears that the plaintiff was not the original inventor, in reference to other parts of the world as well as America, he is not entitled to a patent."). *White* is an interesting example of an early, foreign prior art problem.

earlier, to which the Court responded:

> [I]t is obvious that the mere conception of the improvement by the witness, however perfect the idea may have been, and although he actually described the plan to one person, can not benefit the complainant in this case, because his own testimony shows that he never completed the invention, and reduced it to practice, in the form of an operative fire arm.[164]

Ultimately, however, after an exhaustive review of the testimony, the Court held that the plaintiff had reduced the revolver to practice sufficiently to comply with the patent requirements several years before the Belgium patent issued.[165] Therefore, the plaintiff did not need to tie his efforts back to an earlier date of conception through constant diligence.

*White v. Allen* remains interesting for our purposes here because of the confusion it betrays about the meaning of conception and reduction to practice. The conception plus diligence doctrine developed despite strong statements from the Supreme Court emphasizing the need for reduction to practice as part of the inventive act. As late as 1891, the Court could say that:

> It is evident that the invention was not completed until the construction of the machine. A conception of the mind is not an invention until represented in some physical form, and unsuccessful experiments or projects, abandoned by the inventor, are equally destitute of that character. These propositions have been so often reiterated as to be elementary.[166]

Even the *White* court, in discussing the diligence requirement, explained that inventors may often lose heart while working on an invention, "lose[] confidence in the prospect of . . . ultimate success . . . , decide[] to break up what he has accomplished, and lay[] the parts aside, not positively intending to abandon the subject, yet wholly uncertain whether [they] will ever resume it . . . ."[167] This explanation jars against the idea that concep-

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164. *White*, 29 F. Cas. at 972.

165. *Id.* at 975.

166. Clark Thread Co. v. Willimantic Linen Co., 140 U.S. 481, 489 (1891). *See also* Seymour v. Osborne, 78 U.S. (11 Wall.) 516, 552 (1870); Whitely v. Swayne, 74 U.S. (7 Wall.) 685, 687 (1868); Agawam Co. v. Jordan, 74 U.S. (7 Wall.) 583, 602 (1868) (post-*Reed* cases emphasizing reduction to practice).

167. *White*, 29 F. Cas. at 976.

tion is a complete inventive act from which a person with ordinary skill in the art can reduce the idea to practice.

*White* also offers another interesting insight. Further examining the rule, the *White* court states that:

> Federal courts have everywhere held that an inventor, who has first actually perfected his invention, will not, if he has exercised good faith, be deemed to have surreptitiously or unjustly obtained a patent, for that which was in fact first invented by another, unless the latter was at the time using due diligence in adapting and perfecting what he had accomplished.[168]

This curious little passage suggests that the Court understood the Act of 1836 to deem an honest inventor to have acted "surreptitiously" if another, entirely independent inventor can show prior conception and diligent work.

By 1893, the doctrine had largely achieved the form it holds today.[169] On appeal from the Circuit Court for the Western District of Kentucky, the Sixth Circuit Court of Appeals cited *Bedford v. Hunt* for the general rule that "in the eye of the law he is the first and true inventor who first reduces the conception of a new invention or discovery to practical and operative form."[170] The court found an exception to this general rule in the Act of 1836, as explained by Justice Story in *Reed v. Cutter*.[171] The court then articulated the modern rule, with one exception:

> It is obvious from the foregoing that the man who first reduces an invention to practice is prima facie the first and true inventor, but that the man who first conceives, and, in a mental sense, first invents, a machine, art, or composition of matter, may date his

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168. *Id.*

169. Christie v. Seybold, 55 F. 69 (6th Cir. 1893). Seybold filed his patent application on June 6, 1889, and Christie on June 7, 1889. The patent went to Christie. Seybold had conceived and sketched his idea in October 1885, and showed it to several people in January 1886. *Christie*, 55 F. at 71. A machinist, he lacked the proper tools to build his machine until March 1889, when he moved into a new machinist's shop. *Id.* Seybold did nothing to work on his idea between January 1886 and October 1888, when he had a full-sized drawing of it made. He finished a working model in April 1889. Christie conceived the idea in the summer of 1886. He had working drawings made, and reduced the idea to practice by July 12, 1888. *Id.* The Court of Appeals first considered whether the two devices at issue shared sufficient common features to interfere, and held that they did. *Id.* at 74-75.

170. *Id.* at 75.

171. *Id.* at 75-76 (citing also *White*, 29 F. Cas. at 969).

> patentable invention back to the time of its conception, if he connects the conception with its reduction to practice by reasonable diligence on his part, so that they are substantially one continuous act. The burden is on the second reducer to practice to show the prior conception, and to establish the connection between that conception and his reduction to practice by proof of due diligence.[172]

Because Seybold had reduced the invention to practice second, he carried the burden to prove a date of conception prior to Christie's, and to prove that he had worked diligently to reduce the idea to practice from the date of conception until successful reduction.[173] Seybold failed to carry that burden, so the Court declared that he was "not the true and first inventor."[174] *Christie* differed from the modern rule only in that it required the period of diligence to extend from the original conception all the way through reduction to practice.[175] The modern rule requires only that the period of diligence extend back to a point prior to the second conception.[176]

The adjustment to the *Christie* conception necessary to complete the modern doctrine was not long coming. In 1896, the Court of Appeals for the District of Columbia declared "we see no good reason why [the first conceiver] should be compelled to extend [his diligence] back to the date of his original conception."[177] Subsequent cases followed the D.C. view, and the doctrine has not changed substantively ever since.[178] In fact, by 1936, the Court of Customs and Patent Appeals could state:

> The rule is so well settled as to require no citation of authority that one who is the first to conceive but the last to reduce to

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172. *Christie*, 55 F. at 76.

173. *Id.* at 77.

174. *Id.* at 78.

175. *Id.* at 76. *Christie* explicitly rejected the complete formulation of the modern rule, and recognized that decisions of the Patent Office were already holding that the period of diligence need only extend back as far as the *second* conception to entitle the first conceiver to the patent.

176. *See* New Idea Farm Corp. v. Sperry Corp., 916 F.2d 1561, 1565 (Fed. Cir. 1990).

177. Yates v. Huson, 8 App. D.C. 93 (D.C. Cir. 1896).

178. *See* Gregg v. Coakwell, 175 F.2d 575, 576 (C.C.P.A. 1949); Brown v. Barton, 102 F.2d 193, 197 (C.C.P.A. 1939); Hull v. Davenport, 90 F.2d 103, 105 (C.C.P.A. 1937); Harper v. Zimmerman, 41 F.2d 261 (D. Del. 1930).

> practice is chargeable with diligence from immediately prior to the time the later inventor entered the field, and such diligence must be established by evidence.[179]

Despite their certainty about what the rules were, the courts struggled after *Christie* to explain the doctrine to their own satisfaction. In order to recognize conception as the inventive act, the conception needed to be termed "complete," yet the value of reduction to practice remained apparent to the courts. The United States District Court for the District of Delaware explained in 1930 that:

> Although it is well settled that every invention contains two elements—a mental and a physical one, an idea conceived by the inventor and an application of that idea to the production of a practical result . . . , and that, consequently, an invention does not exist until the generated idea has been reduced to practice, . . . yet it is equally settled that for certain purposes [priority disputes] the law takes notice of the existence of the idea apart from its reduction to physical form.[180]

The cases in the first part of this century hint that the legal rules were perhaps driven by the courts' estimation of the complexity of the inventions they were addressing. In a case in the Circuit Court for the District of Maine in 1908, for example, the court stated: "The invention in this case lies almost entirely in the conception because it is apparent that, when the conception had been fully explained, any person of ordinary skill in the art could put it into practical form."[181] In the opinion of the court on appeal to the First Circuit, the court rejected the suggestion that the reduction to practice requirement would vary with the complexity of the invention—a simple invention could be reduced to practice on paper, while a complex invention required a working model.[182] The developing conceptual ambiguity in the doctrine appears prominently in the court's effort to explain the reduction to practice requirement:

> The law appears to be well established that a conception evi-

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179. Wilson v. Sherts, 81 F.2d 755, 762 (C.C.P.A. 1936).

180. *Harper*, 41 F.2d at 265 (citations omitted).

181. Automatic Weighing Mach. Co. v. Pneumatic Scale Corp., 158 F. 415, 416 (C.C.D. Me.), *rev'd*, 166 F. 288 (1st Cir. 1909).

182. *Automatic*, 166 F. at 292-93.

> denced by disclosure, drawings, and even a model, confers no rights upon an inventor unless followed by some other act, such as actual reduction to practice, or filing an application for a patent. A conception of this character is not a complete invention under the patent laws. It may constitute an invention in a popular sense, but it does not make the inventor the 'original and first inventor' under the statutes. *If it did constitute an invention under the statutes, then an inventor might stop with his drawings and disclosure, and hold the field for all time against a subsequent inventor who has reduced his invention to practice, or who has obtained a patent.*[183]

The court here discusses the fear that a prior conceiver will haunt the more diligent inventor who builds the working model or proceeds with the patent application—another good reason to require reduction to practice to complete the inventive act. The ambiguity comes from the insistence of the courts on emphasizing conception as the inventive act. In order to make conception an act worthy of being termed an invention, the courts defined conception as a complete idea, able to be reduced to practice by the application of ordinary skill in the art. Once that was the definition, however, the continued insistence on reduction to practice created a doctrinal tension between conception and reduction to practice that is evident in the cases. The tension would never have arisen, absent Justice Story's re-conception of the definition of invention in the *Reed* opinion.

*4. The Codification of Error.*—In 1952, the United States codified the first-to-invent system in the form found in the statute today:

> In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.[184]

The legislative history for the 1952 Act shows that Congress intended simply to retain the existing laws for "determination of

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183. *Id.* at 298 (emphasis added).

184. Act of July 19, 1952, ch. 593, 66 Stat. 797-98 (codified as ammended at 35 U.S.C. § 102(g) (1994)).

priority of invention."[185]

The section's predecessor, former 35 U.S.C. § 69, had been only modestly revised since the Act of 1836.[186] The U.S. Code in 1934 provided *inter alia* in separate clauses that an accused patent infringer could affirmatively defend on the basis that

> [the plaintiff] had surreptitiously or unjustly obtained the patent for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same; or
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> . . .
>
> that [the plaintiff] was not the original and first inventor or discoverer of any material and substantial part of the thing patented . . . .[187]

The 1836 Act had provided the same substantive provisions, albeit less clearly delineated.[188] The first-to-invent system has been reaffirmed with each new Act since 1836.

## III. ALTERNATIVES TO THE EXISTING SYSTEM

### *A. The Debate Over the First-to-File Alternative*

*1. The Case for First-to-File.*—One may fairly wonder what policies these rules promote. In light of the historical development of the rules, the policies offered seem more like ex post justifications than aspirations that drove the original creation of the doctrine.

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185. 1952 U.S.C.C.A.N. 2394, 2410 (revision notes to section 102).

186. Act of July 4, 1836, ch. 357, § 15, 5 Stat. 117, 123; Act of July 8, 1870, ch. 230, § 61, 16 Stat. 198, 208 (superceding Act of July 4, 1836); *see also* Act of Aug. 5, 1939, ch. 450, 53 Stat. 1212 (reducing provision for two-year grace period for prior publication to one year); Act of Mar. 3, 1897, ch. 391, 54 Stat. 692 (establishing two-year grace period for prior publication).

187. 35 U.S.C. § 69 cls. 2, 4 (1940). The clarification of the 1836 Act, which existed until the revisions of 1952, was made in 1870. Act of July 8, 1870, ch. 230, § 61, 16 Stat. 198, 208. The legislative history for the 1952 Act recounts that the 1870 effort was originally intended simply to arrange and codify the existing statutes, but the Congressional Patent Committee added substantive amendments to the Act. 1952 U.S.C.C.A.N. 2394, 2395-96. The legislative history for the 1870 Act is elusive, because maintaining official records of Congressional proceedings did not begin until 1873. *See* REAMS, *supra* note 128, at xv.

188. *See* text accompanying note 144, *supra*. CHISUM, *supra* note 18, § 10.02[2][b].

Many commentators have defended the rules in the context of the debate over whether to adopt a first-to-file system. Despite the variety of scholarly defenses of the rule, however, no one has articulated any empirically supported reason to maintain the current system. The most widely stated rationale for the current definition of first to invent is the desire to protect the small inventor, the rugged individualist who creates independently without the support of corporate resources. There certainly is an appealing romance to the mental image of the individual inventor, succeeding on her own, which is consonant with the American world-view generally. Whether the rules actually protect or encourage this type of person, however, is subject to serious question. Assuming they do, whether the creative output of these people is worth the cost of protection is similarly open to question.

The debate over the years has centered on whether to abandon the first-to-invent system altogether, and instead adopt a first-to-file system, as the rest of the world has done. Although this Article assumes that the United States will maintain its first-to-invent system, a quick sketch of the two sides of the first-to-file debate is useful for identifying the values and policies allegedly promoted by the first-to-invent system.

The commentators supporting the adoption of a first-to-file system offer a number of reasons to make the switch. They generally argue that the country already uses a de facto first-to-file system.[189] Some note that litigation over who was first-to-invent

189. As a practical matter, the system presumes the date of invention to be the date that a completed patent application is filed. Innovative Scuba Concepts, Inc. v. Feder Indus., Inc., 819 F. Supp. 1487, 1505 (D. Colo. 1993), *rev'd*, 26 F.3d 1112 (Fed. Cir. 1994). A challenger to the validity of that patent then bears the burden of persuasion by clear and convincing evidence. *Innovative Scuba*, 819 F. Supp. at 1501. If, however, the challenger can show a fully disclosed invention prior to the filing date of the application, the burden shifts to the patentee to prove conception and reduction to practice prior to the pre-filing disclosure. *Id.* at 1505. In doing so, the patentee cannot rely solely on her own, uncorroborated testimony. In fact, the *Innovative Scuba* trial court imposed the burden of persuasion by clear and convincing evidence on the patentee to show prior invention. *Id.* at 1505-07. That portion of the decision was modified on appeal. Innovative Scuba Concepts, Inc. v. Feder Indus., Inc., 26 F.3d 1112, 1115 (Fed. Cir. 1994). The Federal Circuit agreed that the challenger bore the burden of persuasion by clear and convincing evidence, but emphasized that the burden remained with the challenger throughout. Once the challenger establishes a prima facie case of prior invention, the patentee bears the burden of

is rare. Others contend that patent litigation in general is out of control, and the first-to-invent rule is one aspect of a system out of control.[190] The first-to-file supporters further argue that an individual inventor can more easily be taught to file an application than to maintain the records necessary to prevail in a priority litigation under the current system.[191] The first-to-file supporters further contend that the system will diminish the problem of "secret prior art," i.e., prior undisclosed inventions.[192] To maximize this advantage, the system would also need to provide

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going forward with rebuttal evidence, but at no time does the patentee shoulder the ultimate burden of persuasion. *Id.* For a good summary of the debate, available on line, see Gregory Aharonian's discussion of the Patent Office Reform Panel Final Report, Feb. 4, 1993 (visited Apr. 22, 1998) <gopher://wiretap.spies.com:70/00/Gov/Patent/patent.1> (copy on file with the author).

190. *See* FRED WARSHOFSKY, THE PATENT WARS: THE BATTLE TO OWN THE WORLD'S TECHNOLOGY 248-49 (1994). Warshofsky explains that patent litigation is so expensive that the mere threat of it may stop a company from offering a new product or from forming in the first place. *Id.* at 247-48. Warshofsky notes a growing sentiment that the U.S. patent system has begun to stifle rather than promote inventive work. *Id.* at 245-71. In essence, large, established companies with huge litigation resources are able to extract "blood money" from newer companies with the threat of a patent suit, or are even able to discourage competition from even starting. *Id.* at 251-52 & 267.

191. *See* Robert A. Armitage & Richard C. Wilder, *Harmonization: Will it Resuscitate a Patent System Suffocating its Small Entity Users with Cost and Complexity?*, 1 U. BALT. INTELL. PROP. L.J. 116, 117 (1993). Of course, even if the nation switched to a first-to-file system, the dates of conception and reduction to practice would remain relevant, absent further amendment to the system, in disputes over whether an invention was disclosed prior to the patent applicant's date of invention. *See* Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (determining dates of conception and reduction to practice for comparison to date of disclosure by other inventor). The current record-keeping necessary to protect one's invention can be quite burdensome. Two different law firms offering on-line legal advice to inventors both recommend that inventors maintain dated notebooks. For corroboration, both firms further recommend that the inventors ask a third-party, sophisticated enough to understand the work, to review, sign, and date the notebooks. Patricia D. Granados, *How to Prove that You are an Inventor or were First to Invent* (visited Apr. 22, 1998) <http://www.foleylardner.com/PG/IP_BIOT/pate4_meth.html>; Christenson, O'Connor, Johnson & Kindness, *First to Invent—Proving it or Losing it* (visited Apr. 20, 1998) <http://www.lawinfo.com /forum/cojk/first.html>. In a similar vein, in a world where most work is now done on computer, inventors who store their work on disk are advised periodically to "generate and publish an authentication code for their data." Fred Meeker, List-serv submission to the Patent Newsgroup, Feb. 25, 1997 (copy on file with the author).

192. Armitage & Wilder, *supra* note 191, at 118. *See also* ABA Section of Patent, Trademark & Copyright Law, 1987 Committee Reports 61 (1987) [hereinafter 1987 ABA Committee Report].

for early publication of applications.[193] In a similar vein, the first-to-file system would clarify the date of publication for determinations of whether art is "prior."[194] By bringing the U.S. system into harmonization with the rest of the world, the United States would also garner concessions from the World Intellectual Property Organization (WIPO) when negotiating other aspects of international IP law.[195] The ultimate goal, the first-to-filers suggest, is a single world-wide patent application.

The first-to-invent system has historically handicapped foreign inventors applying for patents in the United States, because only inventive acts in this country were recognized to establish the date of invention.[196] NAFTA and the GATT, how-

193. 1987 ABA Committee Report at 61.

194. *Id.*

195. Armitage & Wilder, *supra* note 191, at 118. *See also* ABA Section of Patent, Trademark & Copyright Law, 1990 Committee Reports, Resolution 102-7 at 42-43 (1990). The ABA Committee in 1990 favored the adoption of a first-to-file system, by a slight majority of committee members. The proponents of the switch contended that first-to-file would encourage prompt filing, "eliminate interferences and . . . promote harmonization." *Id.* at 42. (The 1987 Committee Report more accurately notes that interferences would still occur under a first-to-file system to determine who filed first and to adjudicate claims of derivation. 1987 ABA Committee Report at 61.) The 1990 ABA Committee proponents further maintained that first-to-file would result in rights being granted to inventors more quickly, and therefore would promote the progress of science. 1990 Committee Report at 42. The opponents to the switch were distressed by the idea that a patent might be granted to someone not the first inventor, and as a result suggested that the switch might be unconstitutional. They further feared that applicants would be unable to complete proper applications, and did not believe that the United States would receive sufficient benefits from the Treaty to make the switch worthwhile. *Id.* The committee concluded that the constitutional issue was insubstantial, in light of existing law denying a patent to the first inventor in cases of suppression, abandonment or concealment. The committee also found that the Treaty would "provide substantial improvement to foreign protection of technology developed in the United States." *Id.* The Treaty required all countries to "a) adopt simplified and uniform filing requirements; b) recognize a world-wide grace period; c) grant patents in most technical fields; d) broadly interpret patents and apply the doctrine of equivalents; and e) provide injunctive relief and damages for infringement." *Id.* at 42-43. The 1988 ABA Committee favored in principle a switch, but viewed the issue as a potential bargaining chip for other concessions in the Treaty negotiations. ABA Section of Patent, Trademark & Copyright Law, 1988 Committee Reports 65-66 (1988).

196. AIPLA GUIDE, *supra* note 3, § 4. On the other hand, in the big picture, the handicap has not prevented three Japanese companies, Canon, Hitachi, and Toshiba, from attaining first, second, and third place in the race to obtain the most U.S. patents for 1992. WARSHOFSKY, *supra* note 191, at 100. In 1996, the top three patentees were IBM, Canon, and Motorola. Preliminary List of Top Organizations available on line at <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/top.97cos.html>. Hitachi

ever, have changed the law so that as of January 1, 1996, inventive acts in other countries can also be used to establish the date of invention in a U.S. patent application. According to some commentators, this change to accommodate foreign inventors has added another level of complexity to the interference process.[197]

*2. The Case for First-to-Invent.*—The first-to-invent supporters similarly offer a number of reasons to resist the proposed change. Generally, they contend that a first-to-file system would hurt the small inventor, who lacks the financial and informational resources of a corporate patent applicant.[198] From an empirical standpoint, however, whether the small inventor continues to be a major factor in the nation's creative output is subject to some debate.[199] The first-to-invent proponents also raise the possibility that a first-to-file system would encourage "hasty application drafting with limited experimental exemplification or support."[200] As a result of hasty applications, say the

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and Toshiba were both in the top ten. *Id. See* 1996 PTO Annual Rep., *supra* note 3.

197. AIPLA GUIDE, *supra* note 3, § 4.

198. *See* Donald W. Banner, *Patent Law Harmonization*, 1 U. BALT. INTELL. PROP. L.J. 9, 9 (1992). *See also* 1987 ABA Committee at 62: "Supposedly, first-to-invent practice allows the small inventor to reduce an invention to practice in a diligent, but measured fashion, consistent with limited resources, and maintain entitlement to a patent over an earlier-filed patent application of a more resourceful, subsequent inventor. This consideration, while theoretically and historically interesting, has little significance in almost every practical setting." The 1987 ABA Committee Report states that as an empirical matter, first-to-invent priority disputes are almost uniformly the province of corporate parties, who have the resources to maintain careful records of the inventive process, and to support the costs of interference litigation. *Id.* As a result, first-to-file may in fact benefit the small inventor.

199. *Compare* GILBERT KIVENSON, THE ART AND SCIENCE OF INVENTING 2 (2d ed. 1982) (rejecting idea that the day of the small inventor has passed), *with* TREVOR I. WILLIAMS, A SHORT HISTORY OF TWENTIETH-CENTURY TECHNOLOGY 13 (1982) (noting the "diminishing significance of the individual inventor and the small firm"). The PTO reports, however, that in 1996 independent inventors received 17,415 patents, a significant number. 1996 PTO Report, *supra* note 3. There is no way to tell from the raw data how many of those patents will yield any practical results to benefit society, but the sheer volume suggests that the small inventor remains a valuable creative force.

200. 1987 ABA Committee at 62. *See also* MAURICE H. KLITZMANN, PATENT INTERFERENCE LAW AND PRAC. xxiv (1984) (warning that the first-to-file system would result in a "race to the patent office" with speculative ideas and lack of experimentation).

first-to-invent supporters, the burden on the PTO will increase, as applicants are forced to file continuation-in-part applications in increased numbers.[201] The first-to-invent supporters portray a first-to-file system as a potentially unfair race to the PTO.[202] From their perspective, the current system is philosophically and morally superior, and works well enough to continue.[203] They fear the potential for disruption from a major change in the law, worry that the U.S. applicants would lose current advantages over foreign inventors, and even acknowledge the financial interest for the patent bar in maintaining current interference practice.[204]

The matter was fully debated by the ABA Section of Patent, Trademark & Copyright Law in 1987.[205] At that time, the Committee opposed a switch to a first-to-file system.[206] In the ensuing years, the Committee betrayed some ambivalence about the proposed change. The first-to-invent supporters also argue that the change will fail to prevent much litigation. Rather, the priority dispute will simply shift to a different context—into a dispute over the rights of a prior user to continue using the invention that is generally included in proposals to shift to a first-to-file system.[207] That contention, however, is unpersuasive. The frequency of litigation would surely be reduced, even if litigation cannot be reasonably eliminated by a change in the system. In any event, prior user rights are not an indispensable part of a first-to-file system.

One rationale for maintaining the rules allowing a diligent inventor to look back to her date of conception is found in the old cases.[208] When an inventor relies on her patent application

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201. 1987 ABA Committee at 62.

202. *Id.*

203. *See, e.g.*, Coe A. Bloomberg, *In Defense of the First-to-Invent Rule*, 21 AIPLA Q.J. 255, 256-57 (1993). Bloomberg also rather unpersuasively notes that other issues will remain to litigate even after a switch to first-to-file. *Id.* at 257.

204. *Id.*

205. 1987 ABA Committee at 58-67.

206. *Id.* at 60-61.

207. *See, e.g.*, Robert W. Pritchard, Comment, *The Future is Now—The Case for Patent Harmonization*, 20 N.C. J. INT'L L. & COM. REG. 291, 299 (1995).

208. *See* Brown v. Barton, 102 F.2d 193, 198-99 (C.C.P.A. 1939); Hull v. Davenport, 90 F.2d 103, 105 (C.C.P.A. 1937); Martust & Becker v. Heise, 39 F.2d 715, 717 (C.C.P.A. 1930). I have not seen this reasoning discussed in any of the first-to-invent defenses.

to constitute constructive reduction to practice, she must rely on the diligence of her attorney in preparing the application. If the attorney is overwhelmed with other work, she may be delayed in preparing the application, despite diligent efforts. In cases where the patent application is the reduction to practice, an inventor may be unfairly burdened with her attorney's problems. Attorneys undoubtedly see the potential for a malpractice claim in a change in the system.

### *B. An Analytical Framework*

Economic analysis lends itself readily to intellectual property because the property rights created by patent and copyright law are monopoly rights—the right to exclude competitors from making, using or selling the goods protected by the law.[209] The law purposefully trades the social costs incurred by the creation of the monopoly for the social benefits of increased creative output.[210] As a result, a growing body of work applies economic concepts to intellectual property law to determine the value of a given entitlement.[211]

Economic analysis offers a formalized framework from which to evaluate the basis for existing legal doctrines and to propose changes in existing doctrine.[212] Using an economic ap-

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209. *See, e.g.*, Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 247-48 (1994).

210. *See, e.g.*, William Landes and Richard Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 325-27 (1989). Because ideas are a public good, i.e., an infinite number of people can use an idea without using it up, ideas are readily appropriated from the creator by other people. Absent legal protection, the creator will be unable to obtain payment for his work, and so will have no incentive to create. *See* JOHN W. SCHLICHER, PATENT LAW: LEGAL & ECONOMIC PRINCIPLES §§ 2.08 to 2.10, 218[1] (1996).

211. *See, e.g.*, A. Samuel Oddi, *Un-Unified Economic Theories of Patents—the Not-Quite-Holy Grail*, 71 NOTRE DAME L. REV. 267 (1996); Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247 (1994); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990); Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813 (1984); Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305 (1992).

212. *Compare* William Landes & Richard Posner, *Trademark Law: An Economic Perspective*, 30 J.L. & ECON. 265 (1987) (offering economic analysis of the basis for existing trademark doctrine—positive analysis), *with* Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813 (1984) (offering economic

proach, the analyst assumes that people are "rational maximizer[s] of [their] ends in life."[213] The fundamental idea in economics is that "people respond to incentives."[214] In other words, people will try to get what they want and are smart enough to change their methods when someone changes the rules. The premise in an economic analysis of law is that the goal is to seek "efficiency," which means to choose the rule under which "there is no change from that situation that can make someone better off without making someone else worse off."[215]

Well-known law and economics guru Richard Posner describes three rules that economists distill from the fundamental premise that people respond to incentives: 1) the higher the price of a good, the smaller the demand for it; 2) sellers try to get as much as they can for the goods they sell; and 3) people will tend to put resources to their most valuable use in a free market.[216] Based on those three rules, one may derive the further conclusion that in a free market, the price of a good will gravitate toward its cost.[217] The equivalence of price and cost is considered an efficient outcome because: "Only if the price of the good equals its cost of production will those people who value it more than its cost buy it and those who value it less [than its cost] not buy it."[218]

A monopoly exists when a seller has neither competition nor the fear of competition.[219] In theory, a monopolist is able to maximize his profits based on the law of demand, which tells the monopolist that at a given price he will sell a given number of units. As the price increases, the number of units sold diminishes; as the price decreases, the number of units sold increases. The monopolist theoretically is able to calculate the price which

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framework for deciding what patent law should be—normative analysis). *See also* POSNER, *supra* note 21, at 17-19.

213. POSNER, *supra* note 21, at 3.

214. POSNER, *supra* note 21, at 4.

215. POLINSKY, *supra* note 21, at 7 n.4 (defining "Pareto optimality" or "Pareto efficiency").

216. POSNER, *supra* note 21, at 4-10.

217. POLINSKY, *supra* note 21, at 87-89. The cost of a good includes compensation to the employees and a reasonable return on the investment of the owners. POLINSKY, *supra* note 21, at 89.

218. POLINSKY, *supra* note 21, at 89-90.

219. POSNER, *supra* note 21, at 197.

will generate the maximum profit. That price, however, will leave a number of consumers who would have been willing to pay more than the cost of production, but are unwilling to pay as much as the monopolist's price.[220] Thus, to the economist, a monopoly is generally undesirable, because the monopoly permits the seller to extract a higher price than it would in the presence of competition, which denies the product to some consumers who would be willing to pay more than the cost of production.[221]

Despite the general undesirability of monopolies, it is common practice worldwide to offer limited monopoly rights to the inventors of new and useful devices.[222] The economic reasoning stems from the nature of ideas as a public good, i.e., they can be used by an unlimited number of people without using them up.[223] Because the idea is intangible, by its nature it becomes widely available to all consumers once it is disclosed to one consumer.[224] Thus, without some form of legal protection for the creator of an idea, the creator will be unable to recoup the costs of producing the idea. Patent law therefore creates a property right for the creator to offer an incentive to generate ideas that benefit society.[225]

The system-wide goal is not only to induce creative output but also to induce efficient behavior by the participants. Efficient behavior is behavior that maximizes aggregate benefits less aggregate costs.[226] One of the primary dangers generated

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220. The foregone profit from selling to those consumers is known as "deadweight loss," a sum that approximates the waste to society caused by "[t]he effect of [the] monopoly . . . to make some consumers satisfy their demands by switching to goods that cost society more to produce than the monopolized good." POSNER, *supra* note 21, at 201-02.

221. POSNER, *supra* note 21, at 201-02.

222. *See generally* DIGEST OF INTELLECTUAL PROPERTY LAWS OF THE WORLD (1997) (summarizing the copyright, trademark, and patent laws for countries around the world and illustrating the pervasiveness of such protection).

223. *See* SCHLICHER, *supra* note 210, § 2.08 (universal availability ignores transaction costs).

224. *See* SCHLICHER, *supra* note 210, § 2.08.

225. *See* SCHLICHER, *supra* note 210, § 2.13. *See also* Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1549 (Fed. Cir. 1983) ("a patent is a form of property right, and the right to exclude . . . is but the essence of the concept of property") (citation ommitted). There are other possible responses, including contract law and trade secret law. *See* SCHLICHER, *supra* note 210, §§ 2.11 & 2.12.

226. *See* POSNER, *supra* note 21, at 10.

by the patent system is "rent dissipation."[227] Rent is an economic term, referring to the difference between what society will pay for an invention, and the cost of its development, which sum is granted to the inventor as a reward for his labors.[228] The theory is that without this incentive, the danger of imitation will discourage invention.[229] Rent dissipation occurs when the value of the rent is lost through inefficient behavior induced by an incentive to achieve the monopoly profits—"rent seeking."

Rent dissipation can occur in several ways. First, rents are dissipated when too many people invest too many resources in pursuit of an invention.[230] Second, rents are dissipated when too many inventors scramble to patent improvements on an existing invention.[231] Third, rents are dissipated when the inventor spends inordinate resources maintaining secrecy concerning the invention.[232] Rent dissipation theory is most forceful in addressing the second type of dissipation.[233]

There are, of course, some shortcomings to the approach. The key to economic analysis is to make simplifying assumptions.[234] The problems with economic analysis stem in part from the potential for unrealistic assumptions and from the further difficulty of translating the theory into the real world. It is generally acknowledged that assigning a value to the variables used in an economic analysis poses serious difficulties.[235]

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227. Grady & Alexander, *supra* note 211. For critiques of the Grady and Alexander theory, see Donald L. Martin, *Reducing Anticipated Rewards from Innovation through Patents: or Less is More*, 78 VA. L. REV. 351 (1992) and Robert P. Merges, *Rent Control in the Patent District: Observations on the Grady-Alexander Thesis*, 78 VA. L. REV. 359 (1992).

228. Grady & Alexander, *supra* note 211, at 308.

229. Grady & Alexander, *supra* note 211, at 308. For the creative individual, of course, there are incentives to spur creation other than money. It can bring personal satisfaction, generate esteem from others, or fulfill a basic need to create. *See* THOMAS B. WARD, RONALD A. FINKE & STEVEN M. SMITH, CREATIVITY AND THE MIND: DISCOVERING THE GENIUS WITHIN 2-8 (1995).

230. *See* Grady & Alexander, *supra* note 211, at 308 (citing Yoram Barzel, *Optimal Timing of Innovations*, 50 REV. ECON. & STAT. 348 (1968); Jack Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561 (1971)).

231. Grady & Alexander, *supra* note 211, at 308.

232. Grady & Alexander, *supra* note 211, at 308-09.

233. Grady & Alexander, *supra* note 211, at 308.

234. POLINSKY, *supra* note 21, at 2-4.

235. POLINSKY, *supra* note 21, at 123.

If the values used in the analysis can be manipulated, so too can the analyst's outcome. Economic analysis also suffers the criticism that it ignores equity in its pursuit of efficiency.[236] The valuation criticism is the more telling of the two. At some level, for all its formalized methods and impressive jargon, a good deal of economic analysis is little more than organized speculation. There is a logical rigor to it, and it does generate some useful insights into the law. But, at some level, there is always a man behind the curtain whose presence, if acknowledged, calls into question the meaning of the whole show. Economic analysis gives the appearance of an objective analytical framework, but the preconceptions of the analyst necessarily lurk behind the economic facade.[237]

### *C. Doctrinal Alternatives to the Current System*

Despite its shortcomings, an economic analysis has meaningful insight to offer into what definition of first-to-invent is optimal. Of the myriad economic concepts applicable to intellectual property, the most useful for the purpose of this article is rent dissipation.[238] The issue addressed here is not whether the entitlements of a patent should be granted, but to whom should they be granted in the case of independent, reasonably simultaneous creation. Rent dissipation refers precisely to the social loss incurred when multiple parties chase the same entitlement.[239] Optimally, one would like the various parties to expend their labor and time on different pursuits, thus maximizing the social benefit from their labors. When more than one person simultaneously develops the same idea, society has expended twice as much labor as it needed in order to develop the idea. From an individual standpoint, only one of the two creators stands to get a reward, and the other will have expended fruitlessly the time and effort required to develop the idea.

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236. POSNER, *supra* note 21, at 21-23.

237. *See* MARK KELMAN, A GUIDE TO CRITICAL LEGAL STUDIES 151 (1987).

238. *See generally* Grady & Alexander, *supra* note 211 (presenting their theory as a positive explanation for existing law, rather than as a normative theory for suggesting changes to doctrine, as it is being used here).

239. *See generally* Grady & Alexander, *supra* note 211 (providing a thorough discussion of rent disposition theory).

Thus, in a perfect world, the system would be designed to offer maximum encouragement to the party most likely to succeed in developing a given idea, and would divert all others into different pursuits. That is decidedly not the situation produced by our current doctrine. On the contrary, the current doctrine encourages inventors to rent seek—that is, to race to get the prize—the patent. These races will inevitably produce bitter disappointment and wasted effort for the loser of the race.

Adjusting the entitlement itself is, of course, not out of the question. One partial solution recognized in other jurisdictions but not in the United States is the concept of prior user rights, which awards a non-transferable license to an independent creator who puts the invention to use, but fails to file the patent application first.[240] Again, however, the narrow question addressed here is whether the definition of first to invent is itself optimal, taken as given the surrounding rules and entitlements.

For this analysis to work, the crucial assumption is that inventors are rational and understand the implications of the doctrinal set up.[241] In other words, we assume that the inventors will respond to the incentives created by the system, and model their behavior to maximize their individual utility. The sophistication of the individual inventor, however, is one of the factual issues Congress considers when adjusting the rules. One of the often stated fears of the first-to-invent supporters is any change in the doctrine will increase the likelihood that unsophisticated, small inventors will be overwhelmed by corporate patent

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240. Munson, *supra* note 60, at 703-04. *See also* Panel Discussion, *Prior User Rights,* 36 IDEA: J.L & TECH. 406 (1996) (explaining the arguments for and against having prior user rights).

241. A trip to the local library confirms that there is a thriving market for books advising would-be inventors how to create, patent, and market inventions. *See, e.g.,* MARVIN GROSSWIRTH, THE MECHANIX ILLUSTRATED GUIDE TO HOW TO PATENT AND MARKET YOUR OWN INVENTION (1978); GILBERT KIVENSON, THE ART AND SCIENCE OF INVENTING (1982); CALVIN MACCRACKEN, A HANDBOOK FOR INVENTORS (1983). A panoply of information is also available online. *See, e.g.,* John Moetteli, Patent FAQ#2, *The Inventor's First Steps to Protecting his Invention* (visited Apr. 13, 1998) <http://www.sccsi.com/DaVinci/2.html> (describing the PTO's Disclosure Document Program, and briefly discussing the need for diligence between the time of disclosure and either the creation of a working model or the filing of a patent application). There is also no question that the majority of inventive output worldwide comes from well-funded, corporate and government inventors, who have the informational resources to understand that legal doctrines quite well.

applicants.

A useful starting place for this analysis is to consider the extremes of the possible definitions of first-to-invent—i.e., making it synonymous with first-to-conceive or with first-to-reduce to practice. If invent is equated with conceive, then the reduction-to-practice concept must be applied rigorously. As the system currently stands, reduction-to-practice is definitionally no more than a mechanical process of construction, where a person with ordinary skill in the art makes a working model from a fully fleshed conception.

If that is the case, however, there is little justification for requiring reduction-to-practice as part of the inventive process at all. One should note, of course, that the application itself constitutes constructive reduction-to-practice. Recognition of the application as constructive reduction-to-practice fits neatly with the law's definition of conception. Looking good on paper and functioning in the real world, however, are often two different matters entirely. The long-standing recognition of the value of a working model to see if an invention works suggests that equating first-to-invent with first to conceive may result in premature decisions about the value of an invention.[242]

In the end, if the inventor intends to use or market her invention, she must actually build it. United States patent doctrine recognizes the right of an inventor to patent an invention but never use it, but the social benefit to permitting an inventor to repress a new invention without ever conclusively showing that it works seems an invitation to abuse the system.[243]

An obvious drawback to the equation of first-to-invent with first-to-conceive is the potential for more frequent priority disputes. Currently, filing a patent application constitutes constructive reduction to practice. Under a changed model, it could represent a definitive disclosure of the conception. If the reduction-to-practice requirement were eliminated, however, inventors could rely on their notebooks and other less definitive evidence to show the date of invention. But as we have seen in the past,

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242. *See* Bedford v. Hunt, 3 F. Cas. at 37, 38 (C.C.D. Mass. 1817) (No. 1217).

243. Although analysis of the issue is outside the scope of this paper, I question generally the reasoning behind permitting an inventor to suppress her invention for the full patent term.

defining the scope of the inventor's claims is difficult even where an application presents them. If the inventor has the further benefit of defining her claims based on more nebulous evidence, the scope of the inventor's claims will be all the more indeterminate. Whenever the legal rules offer an indeterminate result, the system encourages people to gamble that the outcome of litigation will be favorable for them.

At the other extreme, invent may be equated with reduce-to-practice. This definition would require a greater recognition of the value of reduction. As the current definitional structure stands, reduction-to-practice is nearly irrelevant at the theoretical level, although it is still required. From a philosophical standpoint, equating invent with reduce to practice would require that reduction to practice be recognized as necessary to demonstrate the viability of the idea. Reduction to practice would be more than a simple process of using ordinary skill in the art to build the fully conceived idea; it would be the final proof that the idea works.

Conception would necessarily take on a diminished role in the calculus. In fact, inventor's notebooks would become legally irrelevant—perhaps inadmissible in an interference proceeding.[244] As a result, inventors would no longer need to maintain them, except as useful aids to the inventive process. As a side benefit, the creator's option to protect her work via trade secrecy would be enhanced. Under the current doctrinal structure, some form of corroboration is necessary to prove the date of conception (and any necessary period of diligence). As a result, practitioners recommend that inventors keep detailed notebooks, and have them witnessed, signed, and dated by third-parties at regular intervals. This practice potentially infringes on the maintenance of the shroud of secrecy around a project. Any time a secret is entrusted to another person, that secret becomes more subject to disclosure. Of course, there are alternative methods to develop the corroborative evidence that do not require the inventor to reveal her ideas prematurely. Nevertheless, the benefits of the current doctrine are effectively available only to inventors who understand the law well enough to maintain the necessary re-

244. Creative counsel would likely think of some issue toward which the notebooks had something to offer, the scope of the claims for example.

cords.

From an economic standpoint, the rent dissipation model hints that equating invent with conceive is preferable. Requiring reduction-to-practice before recognition of the invention requires greater expenditure of effort by the two competing parties before a winner is declared. Therefore, there is greater social cost incurred to reach the finish line. Equating invent with conceive, on the other hand, potentially awards the entitlement prematurely. Without requiring actual (not constructive) reduction to practice, there is the potential for an invention to be patented, only to discover later that undue experimentation is required to make the idea work.[245]

We can say with some confidence, however, that current doctrine is inferior to equating invent with either of the two extremes. By setting up a potential conflict between the reducer and the conceiver, the system dissipates rents in ways beyond simply encouraging undue competition. First, because the inventor cannot know that reduction-to-practice will entitle her to the patent, she must keep records as she works to document not only when she first conceived the idea, but also her diligence throughout the period from conception through reduction-to-practice. The sophisticated inventor will expend otherwise needless effort to prepare for the potential for litigation. The unsophisticated inventor will receive no benefit from the system, because she will not know that she needs to maintain these records.

Second, because the system incorporates indeterminate factual issues like the date of conception and the diligence of the inventor, it encourages litigation. An inventor with solid record-keeping practices may prevail over another with shoddy practices, even if the doctrine would have favored the shoddy record-keeper had she been able to prove her case. Because the superior record-keepers will almost invariably be corporate entities, who also have the deep pockets necessary to fund patent litigation, the system in fact encourages predatory behavior by the corporate inventor.[246] The small inventor who keeps poor re-

245. This outcome is wasteful not only because of the need for further effort by the inventor, but because of the blocking effect the patent may have on the work of other inventors.

246. *Cf.* Charles Nesson, *The Evidence or the Event? On Judicial Proof and the*

cords, and cannot afford to litigate in any event, may suffer under the present system. Uncertainty over who is the first inventor, or at least about that person's ability to prove her status, encourages parties to gamble in the courtroom to attain the patent.

From an administrative, i.e., societal, standpoint, reduced litigation must always be desirable. Reduced litigation is also a boon to the system's participants, since money spent to sort out the owner of an entitlement is pure cost. Once litigation commences, the litigants not only expend money on attorneys' fees, but also suffer other costs in the form of lost time and energy during the litigation process. Discovery requires the participation of the litigants themselves, and the mere fact of a pending lawsuit may generate unfavorable news reports or give rival salespeople fodder for disparagement.[247]

Under current practice, an interference remains an expensive prospect. The MPEP projected time frame for litigating the issue through a decision by the PTO Board of Patent Appeals and Interferences alone is nearly two years.[248] From there, the parties face the prospect of an appeal to the Court of Appeals for the Federal Circuit,[249] or a return to square one in a civil action in the U.S. District Court for the District of Columbia.[250]

From an economic standpoint, theorists have also long recognized the effect of prospective litigation costs on behavior.[251] There is evidence in the literature to suggest not only that high litigation costs for the potentially injured party influence that party to take greater precautions, but also that high litigation costs for the injured may encourage the injurer to take fewer

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*Acceptability of Verdicts*, 98 HARV. L. REV. 1357, 1362 (1985) (if the judicial system sends the message that what matters is what "you can do without getting caught," it encourages "amoral risk calculations").

247. *See, e.g.*, Josh Lerner, *Patenting in the Shadow of Competitors*, 38 J.L. & ECON. 463, 470 (1995).

248. U.S. DEP'T OF COMMERCE, PATENT AND TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE (MPEP) § 2300.02, at 2300-6 to 2300-7 (1995). It is worth noting that during the entire pendency of the interference, the files remain secret. 37 C.F.R. § 1.11(e) (1996).

249. 35 U.S.C. § 141 (1984).

250. 35 U.S.C. § 146 (1984).

251. Lerner, *supra* note 247, at 464.

precautions.[252] In other words, if the potential injurer knows that his victim may not be able to afford to pursue a remedy, the injurer is encouraged to indifference toward the potential injury. On that basis, Josh Lerner concludes that "all else being equal, firms should avoid pursuing innovations that are likely to lead to the payment of settlements to rivals, regardless of whether the disputes are actually litigated."[253] This point again calls into question the fundamental position of the first-to-invent supporters—that the current system protects the small inventor. If the small inventor's rights under the system depend on a costly litigation process, a process that large firms are much more likely to be able to fund, then the inventor's rights are cold comfort.

A common point raised by both sides of the first-to-invent/first-to-file debate is that relatively little litigation is generated by the current regime.[254] Once litigation begins, statistics for the years 1989-1991 show that eighty percent of patent interferences are settled prior to a hearing, often by some form of cross-licensing agreement between the parties.[255] One may reasonably ask, however, whether any litigation is justifiable, if it may be removed or reduced by an otherwise palatable change in

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252. Lerner, *supra* note 247, at 464.

253. Lerner, *supra* note 247, at 464. Lerner's research shows that patent litigation has increased as patent rights have been strengthened by the Federal Circuit Court of Appeals. Lerner, *supra* note 247, at 469. Lerner found an average of six patent law-suits filed for every 100 patents issued to corporations. Lerner, *supra* note 247, at 470. Still worse, Lerner's data shows an increasing trend toward large firms using patents to extort licensing settlements from smaller firms. Lerner, *supra* note 247, at 470. Citing the work of Jean Lanjouw, Lerner notes that 55% of businesses with fewer than 500 employees view the potential expense of litigation as a "major factor" in their decision to pursue innovation, whereas only 33% of larger businesses are affected the same way. Lerner, *supra* note 247, at 472 (citing Jean Olson Lanjouw, *Economic Consequences of a Changing Litigation Environment: The Case of Patents* (Working Paper No. 4835, National Bureau of Economic Research 1994)). Other than in the biotechnology industry, Lerner finds that most companies would rather rely on trade secret protection for their innovations than go through the patent process. Lerner, *supra* note 247, at 472.

254. *See* 1995 PTO Report, Table 8—available on the Net (visited May 6, 1998) <http://www.uspto.gov/web/offices/com/annual/annual.html> (providing statistics regarding contested patent applications). That may be so in percentage terms, but when over 200,000 patents are filed in a year, a small percentage yields a lot of litigation. *See* 1996 PTO Report, *supra* note 3 (206,276 applications filed in 1996; 1,598 interferences pending on Sept. 30, 1996).

255. Lerner, *supra* note 247, at 467 & n.12.

the doctrine. Litigation carries no benefits. Further, as Lerner notes, not only litigation but also the fear of litigation may distort the incentives to innovate.[256]

Thus, there may be some additional emotional cost to the inventor caused by the present system in the form of additional uncertainty about enjoying the fruits of her labor. Admittedly, invention is by nature a speculative enterprise. Whatever the doctrinal regime, inventors must work without knowing whether their work will ever pay off by yielding a patentable idea, and further must work without knowing whether some other inventor may complete the conception of the idea first. An overly risk-averse person is not likely to choose to become an inventor. In fact, inventors are likely among the least risk-averse people on the planet.[257]

Nevertheless, if an inventor suffers the further risk of losing the benefit of her work to an alleged, prior inventor, even after getting her patent, there must be some additional uncertainty cost imposed. In a similar vein, a doctrinal change could eliminate the paradox potential created by the current rules. Although the prospect of an absolutely indeterminate factual scenario seems remote, a doctrine which creates that possibility is analytically flawed.

In that light, changing the current doctrine will promote the basic policy of the Act—to foster creative output. If we assume that inventors understand the implications of the current rules, and determine their behavior accordingly, then the current priority dispute doctrine imposes unnecessary costs on individual and corporate inventors, and ultimately discourages the creative output the Act is intended to promote. Although all inventors face the uncertainty that they will never enjoy the fruits of their labor, the greater that uncertainty becomes, the less likely people are to try to create.[258] An inventor who must maintain laborious records of conception and diligence wastes labor that

256. Lerner, *supra* note 247, at 471-72.

257. Inventors in modern society are generally working for large corporations as well, which can afford to accept large risks in order to seek large rewards. The litigation lottery mentality in the patent world highlights this phenomenon.

258. Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 296-314 (1988). Again, given the inventive mentality and the corporate culture that dominates modern inventing, this point may well be true only in theory.

might otherwise be directed to productive effort.

The concern for the small inventor is heart-felt, but ill explained by those who assert it in support of the current regime.[259] Whether a change in the doctrine will actually harm the small inventor is far from apparent. Even if the small inventor will suffer, whether the social cost to maintain status quo is a fair price to protect the interests of the small inventor is similarly far from apparent.[260] Those who argue for the small inventor present little or no empirical data to support their position. At the theoretical level, their position is flawed. Those who favor the current doctrine must present more persuasive evidence or reasoning to support their position. There is currently no reason to accept their assertions.

### *D. Analysis of the Potential Definitions Using an Economic Model*

Returning to economic analysis, the choice among definitions for first to invent presents a difficult question. By constructing a model, to look for an optimal arrangement to minimize costs and maximize benefits, we find that the cloud of uncertainty that surrounds inventive activity prevents an obvious solution. In our model, two independent inventors will work toward the creation of the same invention. At the outset of the model, neither inventor is aware of the other, but understands the possibility that someone else may be working on the same invention. For simplicity's sake, we will ignore the potential to argue for any variation between the two inventions.

First, we will assign sums for the key values in the analysis. Patent law awards an all-or-nothing entitlement to the first inventor. The model will accept that premise and assign a value of $100,000 to the patent. Creation is rarely cost free. Certainly

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259. From an empirical standpoint, it is also worth noting that Canada, which switched to a first-to-file system in 1989, appears not to have suffered any of the dire consequences that the first-to-invent defenders fear. *See* A. David Morrow, *First-to-File: The Canadian Experience*, 6 J. PROPRIETARY RTS. 2, 7 (Dec. 1994).

260. *See also* H.R. REP. No. 104-1733 (1995) (Patent Applications Publication Act of 1995 amends the Act to require early publication of patent applications to reduce duplicative research and to make technology information available); H.R. REP. No. 104-2419 (Inventor Protection Act of 1995 protects the little guy).

the patent process always costs money, but our model will ignore the costs of obtaining the patent itself (i.e., ignore application fees, drafting fees, legal fees, and the like). The model will further disregard marketing and other post-patent expenses necessary to reap the reward the patent offers. Nevertheless, the costs of creation will always include some measure of time investment by the inventor, and likely will involve other costs as well, for materials, tools, and related supplies. Our model will assign a value of $30,000 to the full cost of development of the idea into a patentable invention.[261] Our model further assumes that the two inventors understand that they are engaged in an all-or-nothing race. As a result, when one inventor learns that the other has fulfilled the requirements to be considered "first inventor" and is convinced the other inventor can prove it, she will stop working on the invention. The sooner the losing inventor stops work, the smaller her total investment in development costs will be. The simplified model will split the total development costs into two phases: 1) the costs to complete development of a full-fledged "conception" valued at $10,000, and 2) the costs of testing and refinement of the idea valued at $20,000 (which does not include the $10,000 to develop the conception). Thus, under the model the costs to complete the construction of a working model to fulfill the reduction to practice requirement will be $30,000.

Under the current U.S. patent system, the PTO does not announce that a new invention has been patented until the patent is awarded.[262] In the case of two inventors applying for a patent on the same invention at approximately the same time, the PTO declares an interference and notifies the concerned parties that a priority dispute has arisen. An inventor working on an idea, who has not yet filed, has no way of knowing that a patent on the idea he is working on is already percolating through the system. Recently, Congress has considered passing legislation that would require the PTO to disclose to the public ideas for which patents have been applied within eighteen

261. Under the rational actor assumption necessary for an economic analysis, the cost of development must be less than the anticipated reward, or the inventor will choose not to develop the idea.

262. 35 U.S.C. § 122 (1994).

months of the application.[263]

Although a full analysis of that proposition is beyond the scope of this paper, from a strictly economic standpoint, the proposed legislation seems entirely positive. To the extent it diminishes wasted labor, it benefits both society and the individuals involved. The nation's inventors, however, may not view the proposed change so warmly.[264] Some, at least, protest that the 18-month publication provision will publish American technology to the world before the applicant is granted the security of a patent. Publication may occur in cases where a patent is ultimately denied. According to the National Patent Association, this provision serves the interests of Japan, rather than the United States.[265]

In the view of those who oppose the publication provision, by publishing the patent application, the PTO will simply set in motion the efforts by corporate and foreign inventors to invent around the pending application, and to file improvement applications to box in the idea before it even issues.[266] Still worse, if the patent is ultimately denied, the inventor's work will have been disclosed to competitors with no corresponding benefit to the inventor.

International interests certainly complicate the picture. When we think about using the patent system to foster inven-

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263. H.R. 400, 104th Cong. (1996).

264. *See, e.g., Alliance for American Innovation, Home Page* (last modified Feb. 21, 1998) <http://www.Alliance-DC.org> (including several diatribes against H.R. 400 and the 18-month publication provision).

265. *Id.; see, e.g.,* H.R. 400.

266. *See, e.g.,* Ronald J. Riley, *The Alliance for American Invention* (visited Apr. 6, 1998) <http://www.alliancedc.org/inventors/R.J._Riley/multi91.html>. Riley opens his analysis of H.R. 400 with the following statement:

> As an inventor, I must speak out about multi-pronged attacks against our patent system by foreign paid American lobbyists and law firms and by multinational corporations. America's founding fathers recognized that innovation is crucial to a free enterprise system. Foreign governments and multinational corporations have found allies in the Patent and Trademark Office. They are spending large sums of money to change American patent law. Japan is one of the leaders, but by no means is it the only foreign government trying to influence our lawmakers to make changes that are not in America's best interest. It is important that we not compromise our country's prosperity by allowing foreign interests to weaken our patent laws.

Riley's views are a bit extreme, but represent a sincere, if somewhat incoherent position.

tion, are we thinking about world-wide or nationwide benefit? Intuitively, one suspects that majority of people in this country would respond that the system is intended to promote U.S. interests. For the purpose of this simplified model, however, we will assume that the current system remains in place, and that there is no publication until after a patent is issued.[267] As a practical matter, of course, even if the 18-month publication provision were enacted, a good deal of wasted inventive effort will continue to be expended.

Returning to the economic model, the value of the patent will serve as a proxy for the aggregate good to society from the new invention. The aggregate expenditures by all inventors working on the idea constitute the aggregate social cost of producing the invention. Economic efficiency dictates that the system try to maximize the difference between the two figures.[268]

On those assumptions, we turn to the definition of first-to-invent. Unfortunately, because secrecy is a fundamental component of the inventive process, a change in the definitional structure will accomplish little in terms of maximizing the difference between the aggregate social benefit and the aggregate social costs. Regardless of whether the definition of first-to-invent changes to an equation of "invent" with "conceive" or "reduce to practice," or if the definition remains the same, the inventors will not know what their competitors are doing until they have already expended a great deal of effort. As a result, real-world instances where the changed doctrine will apply to prevent the expenditure of unnecessary labor will be rare.

Some benefit, however, may potentially be obtained by a change. Consider the situation where the first inventor files the application and receives the patent, and the PTO discloses the patent so that the competing inventor becomes aware of its issuance. Assume the competing inventor has developed a full "conception, but has not yet reduced the idea to practice. Under our model, the inventor who holds the patent has expended $30,000

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267. Even then, one suspects that only the best-funded researchers will become aware of a new patent in a timely fashion. Monitoring PTO publications requires the investment of both time and money, which the small inventor may not have.

268. *See* ROBERT C. ELLICKSON, ORDER WITHOUT LAW 156-66 (1991) (explaining an economic, game-theory model for cooperative behavior in society—"The Prisoners' Dilemma").

in development costs, and holds an entitlement worth $100,000. The competing inventor has expended $10,000 in costs and holds no entitlement at all.

Under the existing doctrine, the competing inventor would yet have an incentive to continue working. Obviously, many inventors in that situation will choose to cut their losses and change to a new line of research. Yet, theoretically, if the inventor suspects she can show a date of conception that predates the patent holder's date of application, the competing inventor may choose to gamble and continue to work toward reduction to practice. Particularly where filing the application constitutes constructive reduction, she may choose to file an application and provoke an interference. She may also choose to infringe the patent by using the invention and assert an earlier date of conception in the ensuing litigation. As the stakes rise for a given patent, the parties become more likely to gamble on pursuing their claim.

None of those behaviors is productive from a societal standpoint. Using our simplified model, at the time the competing inventor discovers that another inventor has received the patent, the aggregate expenditure from the two efforts to get the patent is $40,000. The net societal gain is $60,000. If the competing inventor chooses to continue work to reduce the conception to practice, she will spend an additional $20,000, yielding an aggregate expenditure of $60,000 and a net gain of $40,000. Thus, before litigation even commences, there has been a net social loss.

Similarly, if the doctrine were changed to recognize conception as the inventive act and eliminate the reduction to practice component, our model suggests that the doctrine will yield flawed incentives. Assume the same factual scenario—the competing inventor has a full conception when she learns that another inventor has received the patent. She can show a date of conception that pre-dates the patent-holder's application. If she wants to use the invention, as opposed to suppressing it, she will eventually reduce the invention to practice, despite the change in the definitional structure.[269] Therefore, if the inventor choos-

269. If she wants to suppress the invention, the $100,000 value of the invention as proxy for social benefit becomes subject to serious question.

es to pursue a claim to the invention, the net loss to society will be the same as under the existing doctrine.

Changing the definition of first-to-invent to equate with "first to reduce to practice," in contrast, will allow the doctrine to avoid providing an incentive to waste effort. Returning to our example, the inventor has conceived but not reduced her idea to practice when she learned of her competitor's success. She has no incentive to continue work because she cannot prevail.[270] If she has already reduced the idea to practice when she learns of the competitor's success, then the effort has already been expended, and the doctrine cannot remedy the loss.[271]

If we further consider the issues in priority litigation from an economic standpoint, a change to the doctrine again shows its merit. The determination of either the date of conception or the date of reduction to practice must involve a smaller expenditure of time and effort than determining both dates, and then judging the diligence of one of the inventors as well. Intuitively, because reduction-to-practice yields something concrete—either a working model or a patent application, one suspects that reduction to practice will prove a more straightforward issue in litigation than the date of conception. That is not necessarily the case, but we can say with some certainty that a change in either direction would be an improvement over the existing system.

## IV. CONCLUSIONS

The current system is far from optimal. First, it invites needless litigation. The supporters of the existing doctrine contend that there is, in fact, relatively little priority litigation generated by the first-to-invent system.[272] Any needless litigation, however, is too much; there must be some goal or policy that makes it worthwhile. The existing system offers an incentive to gamble by using the interference or court system to pursue a patent that has already been issued to another inventor.

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270. Our model ignores dishonesty as well.

271. The secrecy issues are separate.

272. The issues can also arise in the context of determining whether the patent application must be denied because the invention was disclosed in some periodical or other source prior to the applicant's date of invention. *See, e.g.*, Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376-78 (Fed. Cir. 1986).

The gamblers will most often be sophisticated and well-funded, so the romantic notion that the system protects the "little guy" is misplaced.

Second, the current system imposes unnecessary costs on an inventor, even if no litigation ever develops, in the form of record-keeping and to some extent in the form of anxiety generated by the need to track dates of conception and periods of diligence. Undoubtedly, invention is a pursuit that always requires tolerance for uncertainty. Laws, however, to the extent possible should enable people to order their affairs with confidence. Laws that promote uncertainty cannot be desirable, even where the population for whom the laws matter most are inherently resilient.

Third, the current definitions are doctrinally inconsistent. Either reduction to practice is a mere mechanical process and should not be required, or it is necessary to complete the creative act and "conception" cannot be complete without it. As the doctrine currently exists, there is an element of fantasy in the definitions.

At the bottom line, if the United States insists on maintaining its unique first-to-invent entitlement system, the country would be better served to adjust the definitions in the Act to make "invent" synonymous with either "conceive" or "reduce-to-practice." The economic analysis shows that the preferable doctrine would emphasize reduction to practice, just as courts did in the early years of the nation, before Justice Story interpreted the Act of 1836 to change the doctrine toward its current state.