EXPERIMENTATION AND PATENT VALIDITY: RESTORING THE SUPREME COURT'S *INCANDESCENT LAMP PATENT* PRECEDENT

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> *"If the description [of the invention] be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."*
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> -United States Supreme Court, *The Incandescent Lamp Patent*[1]

> *"[A] patent is not invalid because of a need for experimentation."*
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> -United States Court of Appeals for the Federal Circuit, *W.L. Gore & Associates, Inc. v. Garlock, Inc.*[2]

INTRODUCTION

IN 1982, Congress vested the U.S. Court of Appeals for the Federal Circuit with exclusive jurisdiction over patent appeals.[3] In recent years, the Supreme Court has reversed Federal Circuit decisions for straying from established Court precedent.[4] In *KSR International Co. v. Teleflex, Inc.*, the Court rejected the Federal Circuit's "rigid approach" to patent obviousness as "inconsistent" with the "expansive and flexible approach" articulated in prior Supreme Court precedent.[5] In *eBay, Inc. v. MercExchange, L.L.C.*, the Court found that the Federal Circuit ap-

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[1] 159 U.S. 465, 474 (1895).

[2] 721 F.2d 1540, 1557 (Fed. Cir. 1983).

[3] See John F. Duffy, The Federal Circuit in the Shadow of the Solicitor General, 78 Geo. Wash. L. Rev. 518, 518–22 (2010) (describing the Federal Circuit's creation).

[4] See Damon C. Andrews, Promoting the Progress: Three Decades of Patent Jurisprudence in the Court of Appeals for the Federal Circuit, 76 Mo. L. Rev. 839, 860–63 (2011); John F. Duffy, The Festo Decision and the Return of the Supreme Court to the Bar of Patents, 2002 Sup. Ct. Rev. 273, 339–41 (arguing that the *Festo* decision signaled the Supreme Court's return to patent law).

[5] 550 U.S. 398, 415 (2007).

proached the decision whether to grant an injunction in "the opposite direction" of the Court's precedent.[6] In *MedImmune, Inc. v. Genentech, Inc.*, the Court reversed the Federal Circuit for too "readily dismiss[ing]" close Supreme Court precedent.[7] Even when affirming, the Court has not been kind to the Federal Circuit's reasoning. In *Bilski v. Kappos*, the Court upheld the Federal Circuit's judgment but rejected the Federal Circuit's approach.[8] The Supreme Court's close review of Federal Circuit decision making does not appear to be slowing. The Court heard six patent cases during the 2013–14 Term[9] and reversed the Federal Circuit in five of those cases.[10]

This Note will examine another, previously unrecognized, area where tension exists between the Federal Circuit's approach and Supreme Court precedent. For an invention to receive patent protection, an applicant must provide an enabling description—that is, a description that enables a person of ordinary skill in the art to make and use the invention.[11] The Federal Circuit analyzes whether a description is enabling by applying an eight-factor test to determine whether a person of ordinary skill could practice the invention without "undue experimentation."[12] Yet in *The Incandescent Lamp Patent*, the Supreme Court directed that "[i]f the description [of the invention] be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."[13] In short: The Federal Circuit's approach allows experimentation, while the Supreme Court requires that the inventor obviate experimentation entirely.

The difference in approach becomes clear when considering *Incandescent Lamp*'s context. That case was the culmination of a fifteen-year legal battle between Thomas Edison and George Westinghouse, two titans of nineteenth-century innovation, regarding who would receive patent rights for the light bulb. The Supreme Court decided *not* that Edison invented the light bulb, but held invalid a patent belonging to two other inventors: William Sawyer and Albon Man. Because a person would

[6] 547 U.S. 388, 393 (2006).
[7] 549 U.S. 118, 132 (2007).
[8] 561 U.S. 593, 604, 613 (2010).
[9] Ashby Jones, Critics Fault Court's Grip on Appeals for Patents, Wall St. J. (July 6, 2014), http://online.wsj.com/articles/critics-fault-courts-grip-on-appeals-for-patents-1404688219.
[10] Id.
[11] 35 U.S.C. § 112 (2012).
[12] In re Wands, 858 F.2d 731, 736–37 (Fed. Cir. 1988).
[13] 159 U.S. at 474.

have to perform independent experiments to practice Sawyer and Man's invention, their patent was void.[14] The parties' arguments regarding enablement reveal that the Supreme Court considered, but did not adopt, a standard similar to the one currently embraced by the Federal Circuit.[15]

While many modern patent treatises consider "undue experimentation" to be black-letter law,[16] the Supreme Court has never endorsed, nor even considered, the standard. In adopting "undue experimentation," the Federal Circuit did not cite *Incandescent Lamp*—indeed, the Federal Circuit has *never* cited the case, though it appears to be controlling precedent. In light of recent scrutiny of the Federal Circuit, *Incandescent Lamp* provides authority to challenge an issued patent and seek certiorari review.

Further, *Incandescent Lamp* appears poised for a resurgence. While not cited by any court since 1981, it has been cited in fourteen papers before the Supreme Court since 2001,[17] including four in 2013.[18] While litigants have cited the case in encouraging certiorari review, no party has recognized the tension between the Federal Circuit and Supreme Court standards.[19] This seems particularly remarkable because no court at any level has overruled or even criticized *Incandescent Lamp* in the 119 years since the Supreme Court decided the case.[20] Further, the Court continues to voice concerns about the policies animating *Incandescent Lamp*.[21] The case is a standard in patent law textbooks,[22] and one scholar

[14] Id. at 475–76.

[15] See infra text accompanying notes 151–84.

[16] See 3 Donald S. Chisum, Chisum on Patents § 7.03 (2015); 3 Robert A. Matthews, Jr., Annotated Patent Digest § 20:53 (Nov. 2013) (Westlaw).

[17] Compiled by finding the case in Westlaw, selecting the "Citing References" tab, filtering by "Appellate Court Documents," and counting the filings before the Supreme Court. The fourteen filings citing *Incandescent Lamp* are on file with the Virginia Law Review Association.

[18] See Reply Brief for Petitioners at 1, CoreValve, Inc. v. Edwards Lifesciences AG, No. 12-1325 (Aug. 5, 2013); Brief in Opposition to Petition for a Writ of Certiorari at 20, CoreValve, Inc. v. Edwards Lifesciences AG, No. 12-1325 (July 19, 2013); Brief for Knowledge Ecology International as Amicus Curiae Supporting Petitioners' Petition for Writ of Certiorari at 16, CoreValve, Inc. v. Edwards Lifesciences AG, No. 12-1325 (June 18, 2013); Petition for Writ of Certiorari at 13, 14, 21, 23, CoreValve, Inc. v. Edwards Lifesciences AG, No. 12-1325 (May 6, 2013), cert. denied, 134 S. Ct. 82 (2013).

[19] See, e.g., Petition for Writ of Certiorari, supra note 18, at 13–14.

[20] In Westlaw, zero cases give *Incandescent Lamp* "Negative Treatment." This information was compiled by finding *Incandescent Lamp* in Westlaw and clicking the "Negative Treatment" tab.

[21] See infra text accompanying notes 231–32.

[22] See Martin J. Adelman et al., Cases and Materials on Patent Law 446–47 (2d ed. 2003); Donald S. Chisum et al., Principles of Patent Law: Cases and Materials 167 (3d ed. 2004);

recognized *Incandescent Lamp* as one of the "Top 10" patent cases of all time.[23]

This Note will proceed in three parts. First, I will give a brief overview of the relevant law and describe the background of *Incandescent Lamp*. Second, I will evaluate why the Supreme Court decided the case the way that it did, and how the arguments that the parties presented provide context for what the case means. Finally, I will evaluate the case's effect on enablement doctrine, trace the rise of undue experimentation, and illustrate that the tension between the Federal Circuit's current approach and *Incandescent Lamp* cannot be resolved.

I. BACKGROUND

A. The Law

To understand the *Incandescent Lamp* decision and the arguments that the parties presented to the Supreme Court, it helps to have some background regarding patent law. To receive a patent today, an invention must fall within one of the broadly defined categories of invention (subject to judicially created exceptions),[24] and it must be new,[25] useful,[26] and nonobvious.[27] The patent application must also contain a written description that enables any person skilled in the art to which the invention pertains to make and use the invention.[28] The Federal Circuit determines whether the invention is described in a manner that would enable a person to make and use the invention by evaluating whether that person could make and use the invention without "undue experimentation."[29] The patent document concludes with claims setting out the applicant's invention. Those claims form the legal boundaries of the patent and must "distinctly claim[]" what the applicant regards as his invention.[30] If a reviewing court finds that the patent lacks one or more of

Robert P. Merges & John F. Duffy, Patent Law and Policy: Cases and Materials 266 (5th ed. 2011).

[23] Jason Rantanen, "Top 10" Patent Cases of All Time, Patently-O L. Blog (Dec. 18, 2013), http://www.patentlyo.com/patent/2013/12/top-12-patent-cases-of-all-time.html.

[24] See, e.g., Bilski v. Kappos, 561 U.S. 593, 601–02 (2010).

[25] 35 U.S.C. § 102 (2012).

[26] Id. § 101.

[27] Id. § 103.

[28] Id. § 112(a).

[29] In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

[30] 35 U.S.C. § 112(b).

those requirements, then the patent is found "invalid"—that is, the inventor cannot use it in the present or any later litigation to prevent another from making, selling, or using whatever the inventor claimed to have invented.

These contemporary requirements roughly match the patent requirements at the time of *Incandescent Lamp*. In particular, the Revised Statutes—the precursor to the U.S. Code—at Section 4888 required inventors to file

> a written description of [the invention], and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains . . . to make, construct, compound, and use the same.[31]

Case law at the time also required "invention,"[32] a requirement similar to the current nonobviousness requirement.[33]

B. The Technology

Prior to the work of Edison and Sawyer and Man, there were two forms of electric lighting. First came the arc light. In arc lighting, two pointed pieces of carbon were placed in close proximity to each other. Electrifying the points caused electricity to "arc" across the gap, resulting in light. Because the arc disintegrated the carbons and resulted in a flickering light, however, arc lamps could not be used to light homes.[34] Around the same time, research began on incandescent lamps, which created light in a different way.[35] Incandescent lamps pass current through a conductor, just as modern light bulbs pass current through a thin filament.[36] High currents cause the incandescent conductor to give off light.[37] Early incandescent lamps did not use thin filaments, relying

[31] 1 Rev. Stat. § 4888 (1878).
[32] See, e.g., McClain v. Ortmayer, 141 U.S. 419, 427 (1891).
[33] Giles S. Rich, Why and How Section 103 Came to Be, 14 Fed. Cir. B.J. 181, 189–90 (2004).
[34] *Incandescent Lamp*, 159 U.S. at 470.
[35] Id.
[36] Id.
[37] Id. at 470–71.

instead on a thick incandescent conductor.[38] Edison's main contribution to incandescent lighting was the discovery that a thin, high-resistance filament provided better light than the thick, low-resistance burner employed by researchers like Sawyer and Man.[39]

Research centered on finding a material for the incandescent conductor that was not quickly consumed by the current passing through it.[40] Before 1880, hard mineral carbons seemed the most promising.[41] Those carbons burned slowly in open air,[42] but disintegrated quickly when a current passed through them.[43] Sawyer and Man claimed that they discovered that incandescent lamps could use carbonized fibrous or textile material as opposed to hard mineral carbon.[44] Edison argued he had made that discovery.[45]

Sawyer and Man's narrowest claim in their patent was to an "incandescing conductor for an electric lamp, formed of carbonized paper."[46] Later, the Supreme Court would recognize that the paper claim was likely valid.[47] However, that claim would have been commercially worthless—few, if any, commercially successful lamps used a carbonized paper incandescent conductor.[48] To capture Edison's commercially successful lamp within the scope of their claims, Sawyer and Man had to rely on their broader claim to an "incandescing conductor for an electric lamp, of carbonized fibrous or textile material and of an arch or horseshoe shape."[49] If Sawyer and Man's broader claim was valid, they could control the entire electrical lighting industry—approximately twenty-four million bulbs per year.[50] At the time, there were no successful alter-

[38] See U.S. Patent No. 317,676 fig.3 (filed Jan. 9, 1880).

[39] Robert Friedel, Paul Israel & Bernard S. Finn, Edison's Electric Light: The Art of Invention 41–44 (2010).

[40] *Incandescent Lamp*, 159 U.S. at 471.

[41] Id.

[42] Id.

[43] Brief for Appellee at 18, *Incandescent Lamp*, 159 U.S. 465 (No. 10); accord *Incandescent Lamp*, 159 U.S. at 471 (using the same language as appellee's brief).

[44] Brief for Appellant at 6–7, *Incandescent Lamp*, 159 U.S. 465 (No. 10).

[45] Brief for Appellee, supra note 43, at 22.

[46] U.S. Patent No. 317,676 claim 3 (filed Jan. 9, 1880).

[47] *Incandescent Lamp*, 159 U.S. at 472.

[48] See id. at 471 (stating that Sawyer and Man's patent "was never a commercial success").

[49] '676 Patent claim 1.

[50] Arthur A. Bright, Jr., The Electric-Lamp Industry: Technological Change and Economic Development from 1800 to 1947, at 4 (1949).

natives to carbonized fibrous material incandescent conductors.[51] The outcome of the case, then, would effectively determine who controlled the electric lighting industry in the United States.

C. The Case

Perhaps because of the case's importance, the Supreme Court itself re-captioned the case as *The Incandescent Lamp Patent*.[52] In the court below, the case was captioned *Consolidated Electric Light Co. v. McKeesport Light Co*.[53] That caption tended to obscure the real parties in interest. Consolidated Electric Company, the plaintiff suing on the basis of the broad Sawyer and Man patent, was a subsidiary owned by George Westinghouse.[54] The McKeesport Company, the nominal defendant, really represented Edison's interest.[55] McKeesport used light bulbs from Edison Electric, and Edison agreed to indemnify McKeesport in litigation.[56]

This case was the culmination of fifteen years of litigation between Edison and Westinghouse.[57] At the U.S. Patent Office, Edison attempted to claim that he had invented a lamp using fibrous vegetable material—the very thing that he later argued it was not proper to patent in *Incandescent Lamp*. Once litigation began, Edison attempted to delay Sawyer and Man's patent for as long as possible.[58] As will be explained later, this delay strengthened Edison's case at the Supreme Court.

Justice Bradley, a Supreme Court Justice riding circuit, decided the Western District of Pennsylvania case that led to the *Incandescent Lamp* decision.[59] However, Bradley did not decide the case on enablement grounds. Instead, Bradley found that the prior art invalidated the patent—that what Sawyer and Man had done was not new, or even if it

[51] See id. at 489 (indicating that up until 1904, carbon electric lamps were the only large lamps produced in the United States).

[52] See *Incandescent Lamp*, 159 U.S. at 465 n.1.

[53] 40 F. 21, 21 (W.D. Pa. 1889).

[54] The Sawyer-Man Patent, The Westinghouse-Edison Suit, 8 The Electrical Engineer 286, 286 (June 1889) (describing the suit at the circuit court).

[55] Brief for Appellant, supra note 44, at 11.

[56] Id.

[57] Id. at 14.

[58] Id. at 15–19.

[59] *Consol. Elec. Light Co.*, 40 F. at 21.

was new, that there was no "invention" because of what previous inventors had done before.[60]

II. THE SUPREME COURT OPINION

A. The Opinion

The reasoning employed in the Supreme Court's opinion, in light of the parties' arguments, illustrates the tension with the current Federal Circuit enablement standard. The Supreme Court decided the case by finding that the invention was not adequately described by the specification (that is, that the patent did not enable a person to make and use the invention), though Justice Bradley did not address that argument below and the parties devoted only 47 out of 694 briefing pages to the issue—approximately 6.7%.[61] The opinion is also notable for its brevity, falling at under eight pages of the U.S. Reports.[62]

Justice Brown began the opinion by detailing the state of the art at the time that Sawyer and Man made the original application.[63] He described the differences between arc lights and incandescent lights and described how scientists conducted experiments attempting to find an incandescent light for domestic use that could compete with gas lighting.[64] The material for the conductor, as Justice Brown described it, presented the greatest difficulty to creating a practical bulb.[65]

Justice Brown's framing of the state of the art is important. His description accepted that poorly functioning incandescent conductors existed in the art. Researchers struggled to find not merely an incandescent conductor that *worked*, but an incandescent conductor that worked *well*.

Regarding enablement, Justice Brown began with a discussion of whether Sawyer and Man could claim all fibrous carbon and textile ma-

[60] Id.

[61] Brief for Appellant, supra note 44, at 277–79; Brief for Appellee, supra note 43, at 1–2, 233–61; Supplemental Brief for Appellant at 64–75, *Incandescent Lamp*, 159 U.S. 465 (No. 10); Appellee's Comments on Appellant's Supplemental Brief at 26–28, *Incandescent Lamp*, 159 U.S. 465 (No. 10). Appellant's Brief was 303 pages, Appellee's Brief was 280 pages, Appellant's Supplemental Brief was 82 pages, and Appellee's Comment on Appellant's Supplemental Brief was 29 pages.

[62] *Incandescent Lamp*, 159 U.S. at 470–77.

[63] Id. at 470–71.

[64] Id.

[65] Id. at 471.

terials for incandescent conductors.[66] "[S]uch claim might not be too broad," he said "[i]f the patentees had discovered in fibrous and textile substances a quality common to them all . . . distinguishing them from other materials," and "adapted them peculiarly to incandescent conductors."[67] While Sawyer and Man *had* discovered that an incandescent conductor could be made of carbonized paper, they instead "made a broad claim for every fibrous or textile material, when in fact an examination of over six thousand vegetable growths showed that none of them possessed the peculiar qualities that fitted them for that purpose."[68] As they did not discover a quality common to those materials, Sawyer and Man could not preclude others from investigating them.[69]

Edison's work provided evidence that there was no common quality.[70] His investigations lasted several months and involved myriad materials, which resulted in poor incandescent conductors with "no commercial value."[71] In the course of those experiments, Edison discovered that bamboo worked surprisingly well.[72] The question became "whether the imperfectly successful experiments of Sawyer and Man, with carbonized paper and wood carbon, conceding all that is claimed for them, authorize them to put under tribute the results of the brilliant discoveries made by others."[73]

The Court answered no—there would be no way "for a person to know what fibrous or textile material was adapted to the purpose of an incandescent conductor, except by the most careful and painstaking experimentation[.]"[74] Sawyer and Man could not point to a "general quality, running through the whole fibrous and textile kingdom, which distinguished it from every other, and gave it a peculiar fitness" for use as an incandescent conductor.[75] To allow Sawyer and Man, who had (at best) discovered that certain fibrous or textile materials *worked*, to exclude others from investigating the entire class of material to find something that worked *well* would "discourage [rather] than . . . promote inven-

[66] Id. at 472.
[67] Id.
[68] Id. The Court seemed to accept only the claim to carbonized paper as valid. See id.
[69] Id.
[70] Id. at 473.
[71] Id.
[72] Id.
[73] Id. at 474.
[74] Id. at 475.
[75] Id.

tion."[76] So the Court laid down a clear test for determining whether the description was sufficient: "If the description [of the invention] be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."[77]

B. Analysis

In fashioning a test that obviated the need for experimentation, the Court attempted to reconcile what Sawyer and Man claimed in their patent with what they actually invented. After *Incandescent Lamp*, the Court allows broad claims but shows concern about preempting fields of research.[78] A patent preempting research into a certain field prevents innovation in that field for the term of the patent. Before the Court allows that preemption, it requires inventors to show that they have achieved the best result within that field. Simply recognizing that a field has promise is not an invention; invention is finding a real solution to a real problem. The Court determines whether the patent presents a real solution by asking whether the patent description answers the problem or merely makes a suggestion for others to investigate "by independent experiments."[79]

This approach to enablement explains why the Court began by describing the problem existing in the prior art: that there was no incandescent conductor allowing use of incandescent lighting domestically.[80] Sawyer and Man presented their invention as a solution to that problem—as they stated in their brief, it was a direction to those skilled in the art that carbonized fibrous or textile material could be used as an incandescent conductor in an incandescent lamp.[81] But Sawyer and Man could not preempt researchers from investigating Sawyer and Man's claim simply by saying that the class of materials *could* work. They had to provide evidence (that is, description in the specification) that laid out in detail exactly how the invention *would* work and how another researcher could replicate it. Identifying a class of materials that would also work poorly as an incandescent conductor would not advance the

[76] Id. at 476.
[77] Id. at 474.
[78] Id. at 476 (stating that Sawyer and Man could not "limit other experimenters to the domain of minerals" without discovering something that the other materials had in common).
[79] Id. at 474.
[80] Id. at 470–71.
[81] Supplemental Brief for Appellant, supra note 61, at 68.

field or encourage innovation. The Court would allow Sawyer and Man to preempt the entire field of research only when they actually knew that the entire field of research could work—that is, the scope of their claim could only reach that which they could enable others to make and use.

Matching the claims to what the researcher actually discovered fits the goals of patent law: both to encourage new innovations and to encourage disclosure of those new innovations. A patentee could include description insufficient to enable a person to practice the invention without experimentation for one of two reasons. First, the patentee may be unsure of how to enable a person to practice a broader invention. The Court seemed to believe Sawyer and Man fell into this category—they may have discovered that carbonized paper worked but did not discover a property which would allow construction of incandescent conductors from all fibrous or textile materials.[82] Second, the patentee may be attempting to withhold information to try to achieve patent protection without surrendering information to the public. If allowed, this would defeat the quid pro quo of the patent's exclusive rights.

In either case, it seems just to invalidate the patent. In the former case, the patentee invented only a small subset of the broad claim. He should not receive protection for what he did not invent. In the latter case, the patentee invented what was claimed, but attempted to receive a patent without informing the public of how to make the invention. Refusing patent protection is a just result for applicants who attempt to take advantage of the system in this manner.

The way the Court applied other patent doctrines at the time demonstrates the Court's focus on what the patentee actually invented. In *Westinghouse v. Boyden Power-Brake Co.*, for example, the Court refused to find infringement when the accused device, while within the literal scope of the claims, did not fall within an embodiment described in the specification.[83] The Court decided that finding infringement simply when a device falls within the scope of the claims would allow an inventor to patent the result of his invention, rather than the means by which he achieved that result.[84] Like the *Incandescent Lamp* standard, this holding prevents a patentee from preempting investigation into an entire field without adequate evidence that he deserves such a broad scope.

[82] *Incandescent Lamp*, 159 U.S. at 472.
[83] 170 U.S. 537, 568–69 (1898).
[84] Id. at 569.

One might criticize *Incandescent Lamp* because Sawyer and Man appear to lose their patent rights due to Edison's success. The Court relied on Edison's later experiments to determine that Sawyer and Man did not adequately describe their invention.[85] Edison experimented with over 6,000 different kinds of vegetable growths, and only three species of bamboo actually succeeded as incandescent conductors.[86] Edison performed those experiments, however, *after* Sawyer and Man performed their own experiments.[87]

This may explain Edison's attempts to delay Sawyer and Man's patent. The longer Edison waited before responding to Sawyer and Man's evidence—and the more inoperable fibrous or textile materials Edison could discover—the weaker Sawyer and Man's case would appear. The strategy worked: The Supreme Court adopted, almost verbatim, Edison's description of his experimental investigations.[88]

Sawyer and Man may have believed they had discovered a working incandescent conductor for lamps when they applied for their patent. They might even have believed that they discovered a commonality—that of all of the materials they tried, the ones that worked were those made of carbonized fibrous or textile material. If they *believed* that the discovery lay in the fact that fibrous or textile materials worked at all, then wouldn't that meet the enablement requirement?

The Court suggested that it would not. In discussing the flaws in Sawyer and Man's application, the Court stated that "in fact an examination of over six thousand vegetable growths showed that none of them possessed the peculiar qualities that fitted them for that purpose."[89] By referring to experiments made by a third party, the Court established that enablement is an objective test: whether *one skilled in the art* would have understood the patent to teach a quality common to the entire broad class. Edison put forth evidence—his own work—that a person skilled in the art, at the time of Sawyer and Man's filing, would have under-

[85] *Incandescent Lamp*, 159 U.S. at 473–74.

[86] Id. at 472–73.

[87] Compare Transcript of Record at 343–44, *Incandescent Lamp*, 159 U.S. 465 (No. 10) (stating that Edison adopted bamboo as a conductor around January 30, 1880), with Brief for Appellant, supra note 44, at 100–07 (stating that Sawyer and Man's experiments occurred during 1878–79), and U.S. Patent No. 317,676 (filed Jan. 9, 1880) (bearing an application date of January 9, 1880).

[88] See *Incandescent Lamp*, 159 U.S. at 473–74 (describing Edison's experiments with incandescent conductors); Brief for Appellee, supra note 43, at 236–37 (same).

[89] *Incandescent Lamp*, 159 U.S. at 472.

stood the claim to encompass almost all vegetable growths and that Edison discovered characteristics unique to bamboo.[90] So even if Sawyer and Man did not understand their claim to be that broad, a person of skill in the art would have.

The lesson from the case, then, is that the claims in a patent must fit what the inventor actually invented, measured at the time of the filing of the patent. The Court uses the specification of the patent application as a proxy to measure what the patentee actually invented. The scope of the claim matches the discovery if, based on the provided specification, a person skilled in the art could practice the invention without experimentation.

C. Why Enablement?

It is unclear from the face of the opinion why the Court used enablement to decide the case rather than, for example, the prior art. While the Court briefly addressed the prior art, it also stated that resolving the prior art issue was unnecessary to the resolution of the case.[91]

The Court may have been concerned about the impact that relying on the prior art may have had on others working in the lighting industry. Finding that the arch form or the use of carbonized fibrous material was old in the art could have affected others in the industry, in addition to Sawyer and Man. A decision that carbonized fibrous material was not new would have called similar patents—such as Edison's patent on a bamboo incandescent conductor[92]—into question. Such a proclamation could have disrupted the lamp industry, allowing others to copy existing designs and reducing incentives to develop new incandescent conductors.

Enablement essentially states that regardless of the inventor's actual contribution, the patent document itself is fatally flawed. Thus, deciding the case on enablement allowed a narrow decision. That ground also would not affect Edison's ability to obtain patents, as deciding the case on prior art grounds might, and would not bring the courts into conflict with the Patent Office, as deciding that Edison invented first might. Instead, the Court chose not to comment on what Sawyer and Man or Edison actually invented and decided that the legal document was defective.

[90] Brief for Appellee, supra note 43, at 237–38.
[91] *Incandescent Lamp*, 159 U.S. at 476–77.
[92] U.S. Patent No. 251,540 (filed Aug. 6, 1880).

In doing so, it laid down a clear holding for what would be required to meet the enablement requirement: The patent must allow the invention to be practiced without experimentation.

Of course, it is also possible that the Court was motivated to find a ground of decision that did not involve evaluating the myriad expert arguments and evidence. Though the parties argued the case in the fall of 1894, the Court did not issue its decision until well into the 1895 Term. The *Wall Street Journal* reported that the delay was due to "the record [being] so voluminous that it was impossible for the Court to get through it before the time fixed for final adjournment."[93] While the Court at the time seemed willing to engage in an in-depth analysis of technology in other cases,[94] it did not do so in *Incandescent Lamp* other than to briefly detail the history of the art.[95]

III. EXPERIMENTATION AND *INCANDESCENT LAMP*'S EFFECT ON THE ENABLEMENT STANDARD

A. Historical Understanding

Textbooks before *Incandescent Lamp* do not mention experimentation when discussing the sufficiency of the specification. For example, a patent law textbook published in 1895 (before the Court's decision) states that the patent must have adequate description but does not mention experimentation.[96] An 1884 statement of the law similarly does not reference experimentation in determining sufficiency of the specification.[97] Presciently, Professor William Robinson's *The Law of Patents for Useful Inventions* states that "if experiment or inventive skill on the part of the constructor or the user is necessary to render the invention available in practice, the Description is fatally ambiguous, and the patent granted

[93] The McKeesport Case, Wall St. J., June 4, 1895, at 2. It was "claimed by persons pretty close to the Court that the opinion when handed down would reverse the decision of the Court below." Id. The same day, however, the *Chicago Daily Tribune* reported that the Supreme Court would hold the Sawyer-Man patents invalid. Electric Lamp Patents Not Valid, Chi. Daily Trib., June 4, 1895, at 1.

[94] See, e.g., *Westinghouse*, 170 U.S. at 567–69.

[95] See *Incandescent Lamp*, 159 U.S. at 470–71.

[96] See Albert H. Walker, Text-Book of the Patent Laws of the United States of America 158–59 (New York, Baker, Voorhis & Co. 3d ed. 1895).

[97] William P. Kookogey, Patent Law in Brief 21–23 (New York, Baker, Voorhis & Co. 1884).

on the specification which contains it is invalid."[98] Robinson was the "leading patent scholar of the late nineteenth and early twentieth centuries"[99] and "the leading treatise writer of the late nineteenth century."[100] His treatise has been recognized as "the leading patent treatise of the nineteenth century."[101] The Court did not cite Robinson in writing *Incandescent Lamp*, but it seems that Robinson alone articulated an experimentation standard.

That changed after *Incandescent Lamp* came down. A 1909 textbook cited *Incandescent Lamp* for the proposition that "[i]f the description be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."[102] A 1911 treatise understood *Incandescent Lamp* to mean that the specification "must obviate experimentation in practicing the invention."[103] Similarly, a 1920 textbook used *Incandescent Lamp* as an example in discussing that the description must be definite.[104] While "[t]here had been considerable difficulty" in the art regarding creating a filament that did not disintegrate quickly, the "improvement described by the patentees" did not provide "especial description of making [the] conductor," and therefore required independent experimentation.[105]

For seventy years after the decision, federal courts used *Incandescent Lamp* to invalidate patents for supplying insufficient description. Less than one month after *Incandescent Lamp*, the Third Circuit used the rule to invalidate a patent.[106] Almost every circuit routinely employed the "without experimentation" standard to determine sufficiency.[107] As re-

[98] 2 William C. Robinson, The Law of Patents for Useful Inventions 91–92 (Boston, Little, Brown & Co. 1890).

[99] Mark J. Buonaiuto, The Use of Derived Information as Prior Art Under Section 103 of the Patent Act, 79 Nw. U. L. Rev. 423, 442 n.96 (1984).

[100] John F. Duffy, Reviving the Paper Patent Doctrine, 98 Cornell L. Rev. 1359, 1368 (2013).

[101] Mark A. Lemley, The Myth of the Sole Inventor, 110 Mich. L. Rev. 709, 713 (2012).

[102] William Macomber, The Fixed Law of Patents 832 (1909).

[103] 1 James Love Hopkins, The Law of Patents and Patent Practice in the Patent Office and the Federal Courts with Rules and Forms 102–03 (1911).

[104] John Barker Waite, Patent Law 171 (1920) (referring to the case as "Incandescent Light Patent").

[105] Id. at 171–72.

[106] Chem. Rubber Co. v. Raymond Rubber Co., 71 F. 179, 183 (3d Cir. 1895).

[107] See, e.g., M. Swift & Sons v. W.H. Coe Mfg. Co., 102 F.2d 391, 395 (1st Cir. 1939); Schering Corp. v. Gilbert, 153 F.2d 428, 433 (2d Cir. 1946); R.H. Comey Co. v. Monte Christi Corp., 17 F.2d 910, 912 (3d Cir. 1927); Sears, Roebuck & Co. v. Minn. Mining & Mfg. Co., 243 F.2d 136, 141–42 (4th Cir. 1957); Fruit Treating Corp. v. Food Mach. Corp.,

cently as 1964, the district court in Maine used the "without experimentation" standard to invalidate a patent.[108]

Yet the courts also understood the purpose of the doctrine. The D.C. Circuit explained, citing *Incandescent Lamp*, that a patent was invalid because "the patent monopoly would be extended beyond the discovery and discourage rather than promote invention."[109] The Sixth Circuit also cited to *Incandescent Lamp* for the idea that exclusive rights granted by the patent must correspond to what the inventor actually created.[110] More than thirty years after the Court decided the case, the Court characterized *Incandescent Lamp* as not allowing "[t]he patent monopoly [to] extend[] beyond the discovery."[111] Allowing such breadth "would discourage rather than promote invention."[112]

Twenty years after *Incandescent Lamp*, the Supreme Court also provided further insight into what detail a patent must provide to be found valid. In 1916, the Court decided *Minerals Separation v. Hyde*[113]—a case that, as this Note will later explain, would prove important to the development of the undue experimentation standard.[114] In *Hyde*, the patentees discovered a new process for separating metal ore from the unwanted rock surrounding it by placing it in an oil solution and agitating the solution.[115] The Court found "untenable" the "claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results."[116] In short, the Court found the necessity of "preliminary tests" did not invalidate the patent because "[s]uch variation of treatment must

112 F.2d 119, 121 & n.2 (5th Cir. 1940); Germer Stove Co. v. Art Stove Co., 150 F. 141, 145 (6th Cir. 1907); Nat'l Theatre Supply Co. v. Da-Lite Screen Co., 86 F.2d 454, 455 (7th Cir. 1936); Reflectolyte Co. v. Luminous Unit Co., 20 F.2d 607, 612 (8th Cir. 1927); De Lamar v. De Lamar Mining Co., 117 F. 240, 247 (9th Cir. 1902).

[108] H.C. Baxter & Bros. v. Great Atl. & Pac. Tea Co., 236 F. Supp. 601, 612 (D. Me. 1964).

[109] Decker v. FTC, 176 F.2d 461, 463 (D.C. Cir. 1949).

[110] Libbey-Owens-Ford Glass Co. v. Celanese Corp. of Am., 135 F.2d 138, 145 (6th Cir. 1943) ("The maintenance of a patent monopoly is admissible only where the selected point corresponds with physical phenomena, and the patentee has discovered the point at which such physical phenomena occur.").

[111] Holland Furniture Co. v. Perkins Glue Co., 277 U.S. 245, 257 (1928).

[112] Id.

[113] 242 U.S. 261 (1916).

[114] See infra notes 140–212 and accompanying text.

[115] *Hyde*, 242 U.S. at 263.

[116] Id. at 270.

be within the scope of the claims."[117] The Court went on to say that "the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter."[118] As "[t]he composition of ores varies infinitely . . . it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case."[119] Thus, "the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application."[120]

Incandescent Lamp had its greatest influence in the 1930s, when federal courts cited it twenty-five times.[121] Its influence declined in the ensuing decades. It was cited sixteen times in the 1940s, seven times in the 1950s, five times in the 1960s, twice in the 1970s, and once in the 1980s.[122] No court at any level has cited *Incandescent Lamp* since 1981. In the 1981 case, however, the court stated the standard as whether "the description in the patent is so vague and uncertain that those skilled in the art cannot determine how to reach the result claimed by the applicant except by *extensive* experiment and without guidance from the patent."[123] That case was decided the year before the creation of the Federal Circuit,[124] and after the Court of Customs and Patent Appeals ("CCPA") began the shift to an undue experimentation standard.

B. The Rise of Undue Experimentation

In determining enablement, the Federal Circuit currently asks not whether the invention could be practiced without experimentation but rather whether the invention could be practiced without *undue* experimentation.[125] The canonical citation for that standard is *In re Wands*.[126]

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[117] Id.
[118] Id.
[119] Id. at 271.
[120] Id.
[121] This information was compiled by finding the case in Westlaw, clicking the "Citing References" tab, filtering by cases, and counting the cases within each decade. The twenty-five cases are on file with the Virginia Law Review Association.
[122] This information was compiled by the same method described supra note 121.
[123] Int'l Tel. & Tel. Corp. v. Union Carbide Corp., No. 77-701, 1981 WL 40520, at *22 (D.S.C. Apr. 27, 1981) (emphasis added).
[124] See Duffy, supra note 3, at 522.
[125] See, e.g., Cephalon, Inc. v. Watson Pharm., Inc., 707 F.3d 1330, 1336 (Fed. Cir. 2013).
[126] 858 F.2d 731, 737 (Fed. Cir. 1988); see also Merges & Duffy, supra note 22, at 277 (using *Wands* as the second principal case on enablement after *Incandescent Lamp*).

The inventors in *Wands* attempted to patent a method of diagnosing hepatitis B by using antibodies to detect the presence of certain antigens.[127] The Patent Office rejected their application for lack of enablement.[128] The specification did not detail how to make the specific antibodies used by the invention, but the inventors argued that the antibodies could have been made from "readily available starting materials" through "routine screening."[129] Both parties agreed that the materials were readily available and that the methods of screening were well known within the particular field.[130] The inventors had 143 different types of materials that they could screen but only, in fact, screened nine of them.[131] Of those nine, four fell within the claims.[132] The Patent Office argued that four successes out of 143 total possibilities indicated that undue experimentation would be required; the inventors argued that four successes out of nine tested indicated that any experimentation was not undue.[133] The Federal Circuit found that it was "unduly harsh" to classify the untested materials as failures, and so found that in light of the guidance given in the specification, working examples, a high level of skill in the art, and the well-known nature of the methods of the invention, experimentation was not undue.[134]

In resolving *Wands*, the Federal Circuit set out eight factors that courts should consider in determining whether the undue experimentation requirement has been met. Those factors are the breadth of the claims, the nature of the invention, the state of the prior art, the level of ordinary skill in the art, the predictability of the art, the amount of direction provided in the specification, any working examples, and the quantity of experimentation needed relative to the disclosure.[135] The decision, however, does not mention *Incandescent Lamp* at all.[136]

That seems particularly remarkable considering that the facts of *Wands* are similar to the facts of *Incandescent Lamp*, albeit in a different technological field. In both cases, the purported inventors claimed to

[127] *Wand*s, 858 F.2d at 733–34.
[128] Id. at 733.
[129] Id. at 736.
[130] Id.
[131] Id. at 739.
[132] Id.
[133] Id.
[134] Id. at 739–40.
[135] Id. at 737.
[136] See id.

have discovered that a broad class of materials would work for a particular purpose, but in fact seemed only to know for certain that a small number of the materials within that class worked for that purpose. However, the cases came to opposite results. In *Incandescent Lamp*, the fact that few materials worked out of 6,000 tested indicated that experimentation was required and the enablement requirement was not met.[137] In *Wands*, the Federal Circuit found that because testing was within the realm of "routine screening," the specification met the enablement requirement.[138]

Rather than rely on *Incandescent Lamp*, *Wands* relies on previous Federal Circuit cases, cases before the CCPA, and a single Supreme Court case.[139] As shown in Figure 1, if traced back, all of the cases cited in *Wands* for the undue experimentation standard lead either to CCPA cases providing no citation for the standard or to *Minerals Separation v. Hyde*.[140]

[137] 159 U.S. at 472.
[138] *Wands*, 858 F.2d at 736–37.
[139] See id. at 737 n.19.
[140] 242 U.S. at 261.

Figure 1: *Wands* Case Citation Chain

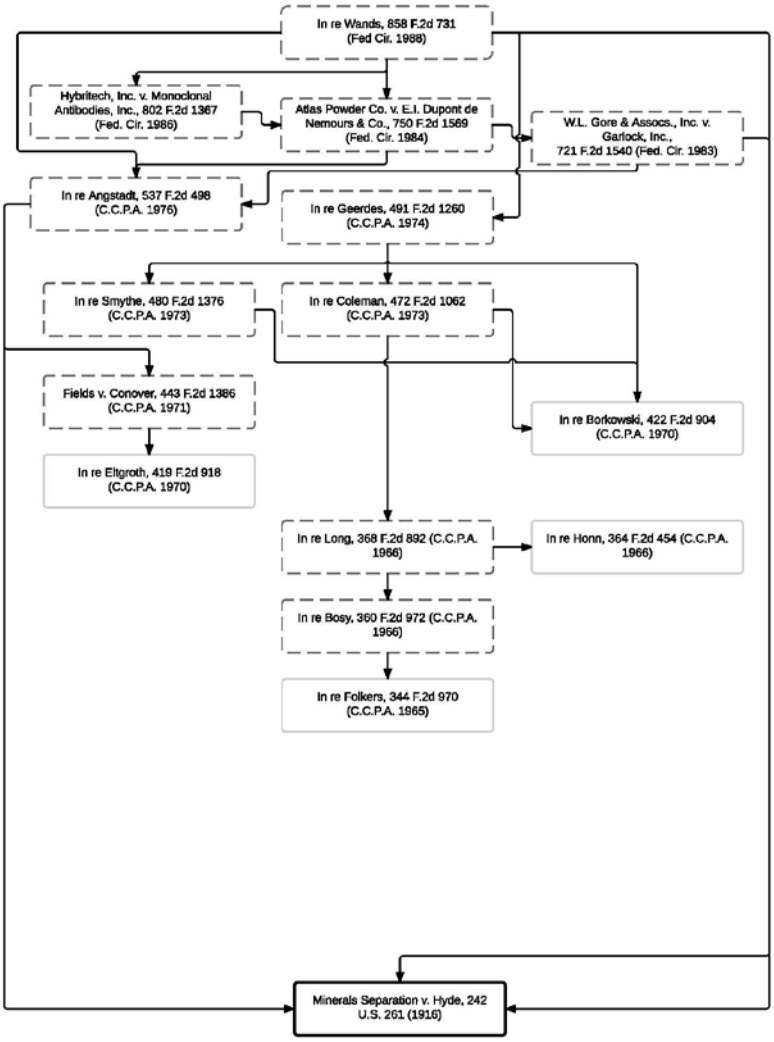

Figure 1 illustrates the chain of cases that *Wands* cites for the undue experimentation standard, with arrows indicating the earlier precedents that each decision cites. Cases that do not provide any citations for undue experimentation have a solid, gray border, while cases that cite earlier precedents have a dotted, black border. So, for example, *Coleman* cites

Borkowski and *Long*, but *Borkowski* does not cite any precedent for undue experimentation.

As the figure shows, between 1965 and 1970 the CCPA articulated an undue experimentation standard without citing precedent. The standard seemed to develop because several judges believed that the enablement standard was too high.[141] In his dissent in *In re Moureau*, Judge Smith accepted that "there is no record evidence to indicate that one skilled in the art would be able to use the claimed composition of matter as a pharmaceutical without further experimentation," but argued that "35 U.S.C. § 112 . . . does not require such 'evidence.'"[142] Judge Rich joined Judge Smith in dissenting on similar grounds in a later case.[143]

Over time, however, Judge Smith and Judge Rich's position prevailed.[144] The watershed case is *In re Angstadt*[145]—a case cited directly by *Wands*. *Angstadt* is important because it is the first case where the CCPA cites *Hyde* to support the undue experimentation standard. In *Angstadt*, the dissent argued that the specification was insufficient.[146] The majority responded—without citing *Incandescent Lamp*—that "this court has never held that evidence of the necessity for any experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue."[147] The majority argued that the dissent wanted patents "to make everything predictable in advance, which is impracticable and unreasonable."[148] Doing so would "frustrate[] the intended operation of the patent system."[149] Rather than finding that "undue experimentation" was required by the Supreme Court, *Angstadt* viewed it as the best policy. The opinion never addressed the argument that "undue experimentation" may be in tension with Supreme Court precedent, nor that *Incandescent Lamp* articulated a different standard. Instead, the CCPA cites to *Hyde* for the proposition that a specification may allow undue experimentation—even

[141] See, e.g., In re Moureu, 345 F.2d 595, 598 (C.C.P.A. 1965) (Smith, J., dissenting).
[142] Id.
[143] In re Corneil, 347 F.2d 563, 569 (C.C.P.A. 1965) (Smith, J. & Rich, J., dissenting).
[144] In re Long, 368 F.2d 892, 895 (C.C.P.A. 1966).
[145] 537 F.2d 498, 504 (C.C.P.A. 1976).
[146] Id. at 505–07 (Miller, J., dissenting).
[147] Id. at 504 (majority opinion) (emphasis omitted).
[148] Id.
[149] Id.

though the words "undue experimentation" do not appear in the opinion.[150]

In *Angstadt* and *Wands*, then, the CCPA and Federal Circuit seem to, without relying on precedent, articulate a standard different from the standard articulated by the Supreme Court in *Incandescent Lamp*.

C. Responses and Counterarguments

The fact that two standards use different words does not necessarily mean that they conflict. One could respond to the apparent inconsistency by arguing that the Court would have accepted the undue experimentation standard if it had the chance; that *Incandescent Lamp* is no longer good law; that undue experimentation is a natural evolution of the *Incandescent Lamp* approach; or that the two approaches are in fact consistent. Each response, however, is unavailing.

First, one could argue that the Supreme Court would have adopted the *Wands* standard if the parties presented it. However, the parties in *Incandescent Lamp* presented arguments quite similar to the two standards in their briefs. Edison urged the Court to adopt a standard that obviated the need for experimentation; Sawyer and Man advocated a standard akin to undue experimentation.

Edison began his brief by arguing that Sawyer and Man's patent for a carbonized fibrous material incandescent conductor did not enable a person to make and use their claimed invention.[151] He argued that while Sawyer and Man stated in their application that paper and wood could be used as an incandescent conductor, they did not describe other types of carbonized fibrous materials.[152] Edison argued that the specification needed to do more than that—more than, as he characterized it, "say[] '[u]se fibrous or textile carbon,' and the 'intelligent artisan' would succeed at once."[153]

Edison argued that the specification was insufficient because there were only a few members of the vegetable kingdom suited for use as an incandescent conductor, and many materials not suited for use.[154] Edison referred to his own actions in arguing that Sawyer and Man's specifica-

[150] Id. at 503. But see *Hyde*, 242 U.S. 261 ("undue experimentation" not mentioned).
[151] Brief for Appellee, supra note 43, at 1–2.
[152] Id. at 233.
[153] Id. at 234.
[154] Id.

tion was insufficient.[155] In developing his incandescent conductor, Edison tested "not less than 6,000 different species of vegetable growth."[156] Of all of the species, "he found suitable for his purpose only about three species of bamboo."[157] Further, those species had properties not present in other vegetable materials, which uniquely suited them for use as incandescent conductors.[158] Edison testified that he tried every fibrous carbon available, and that when he used bamboo it "gave surprising results."[159] By examining the bamboo under a microscope, he determined that its structure was different from other vegetable materials.[160] In fact, bamboo was a good incandescent conductor because it had *few* fibers.[161] Whereas most other vegetable materials had fibers arrayed randomly throughout, bamboo had a parallel structure.[162] So while Sawyer and Man directed their patent to carbonized fibrous material, the presence of fibers—the only thing which all of those materials had in common—in fact *detracted* from their ability to perform as incandescent conductors.[163] Edison cited testimony from a noted botanist, who stated that while vegetable fibrous substances included almost all vegetable growths, he did not know of any growth which had the combination of characteristics shown in Edison's bamboo.[164]

Even if limited to paper (which the patent does specifically reference as an incandescent conductor), Edison argued the specification provided insufficient description.[165] Edison testified that many varieties of paper were completely useless as an incandescent conductor.[166] Further, Edison stated that Sawyer and Man's company used bamboo in their own lamps for some time and performed experiments to find another material to avoid Edison's patent on bamboo.[167] Sawyer and Man created 250 lamps with burners made from at least ten different fibrous and textile

[155] Id. at 236–37.
[156] Id. at 236.
[157] Id.
[158] Id.
[159] Id.
[160] Id. at 236–37.
[161] Id. at 237.
[162] Id.
[163] Id.
[164] Id. at 237–38.
[165] Id. at 243–44.
[166] Id. at 244.
[167] Id. at 249.

materials, but all of them failed.[168] After summarizing the scant Supreme Court cases on the issue, Edison argued that "the test of sufficiency of description in a patent . . . is whether it will enable those skilled in the art to attain the desired result *without experiment*."[169]

While Edison argued that this rule was clear, no Supreme Court case had squarely held that "without experiment" *was* a rule. Previous cases had held patents invalid for insufficient description when the patentee invented new compositions of matter or a compound, but did not detail the precise ingredients or specifications for the new compounds.[170] That situation is distinct from the issue that Edison addressed. Sawyer and Man made the "ingredients" clear—everyone knew the pieces necessary to make an incandescent bulb. The issue was selecting the material for the conductor. Edison thus synthesized the law to argue for an extension: that a description was invalid not merely when determining the composition of a new compound required experimentation, but when determining what the patentee invented required experimentation.

It was only in their supplemental briefing that Sawyer and Man addressed the enablement argument.[171] They responded that Edison exaggerated the differences between the types of fibrous material and that including other information would have been superfluous.[172] They argued that when a person skilled in the art was "told to make a conductor out of carbonized fibrous or textile material," that person would know to use "the class of fibrous textile material generally suitable for the purpose."[173] At the time of invention, "Sawyer [and] Man knew, and every other person skilled in the art knew, that there were degrees of excellence among fibrous and textile materials, and after a constructor was once told to make a conductor by taking material . . . and carbonizing it, he needed no further instructions."[174]

The point, Sawyer and Man argued, was that what tied together all fibrous or textile materials was the fact that they *were* fibrous or textile

[168] Id.
[169] Id. at 257.
[170] See Bene v. Jeantet, 129 U.S. 683, 686 (1889) (hair treatment chemical); Tyler v. Boston, 74 U.S. (7 Wall.) 327, 330 (1868) (burning fluid); Wood v. Underhill, 46 U.S. (5 How.) 1, 4–5 (1847) (brick); see also Howard v. Detroit Stove Works, 150 U.S. 164, 167 (1893) (stove).
[171] See Supplemental Brief for Appellant, supra note 61, at 64–75.
[172] Id. at 65–66.
[173] Id. at 66.
[174] Id. at 68.

materials.[175] A person could find which materials worked as incandescent conductors through their own tests using well-known processes and Sawyer and Man's patent application as a guide.[176] Sawyer and Man thus argued that Edison was applying the wrong standard.[177] The question was not whether a person skilled in the art would understand how to make and use the invention in a way that would enable the lamp to work *without experiment*, but whether a person in the art could make and use the invention *after performing their own investigations*.[178]

However, Sawyer and Man did seem to recognize that those investigations could not be of an inventive nature themselves. In arguing that their specification was sufficient, they contrasted "inventive experiments" with "workman's experiments."[179] Sawyer and Man described what they meant by "workman's experiments" through an example: "experiments, such as a violin maker would make in selecting wood for his violin. He knows what class of wood he must select from, but tests the several pieces to see which are the best."[180] Other than that example, however, Sawyer and Man did not detail what renders something a "workman's experiment" rather than an "inventive experiment."[181] The standard that Sawyer and Man suggested, notably, seems quite similar to the standard accepted by the Federal Circuit in *Wands*: As long as a person of ordinary skill would know the process to achieve the result (just as a violin maker would know how to select from among the various woods), subsequent tests do not rise to the level of undue experimentation.[182]

The argument that the Court would have embraced undue experimentation if given the chance, then, seems untenable. Sawyer and Man specifically presented the Court with what amounts to an articulation of the undue experimentation standard, and the Court chose Edison's standard instead—a standard that requires inventors to obviate invention entirely. Even the Court's language closely mirrors the standard Edison advocated. Edison argued that "the test of sufficiency of description in a patent . . . is whether it will enable those skilled in the art to attain the de-

[175] Id.
[176] Id. at 68–69.
[177] Id. at 64–65.
[178] Id. at 67–68.
[179] Id. at 69.
[180] Id.
[181] See id. at 69.
[182] *Wands*, 858 F.2d at 738–40.

sired result *without experiment*."[183] The Court held that "[i]f the description [of the invention] be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."[184]

Second, one could argue that *Incandescent Lamp* is no longer good law. After all, the Court decided *Incandescent Lamp* in 1895, and Congress passed new Patent Acts in 1952 and 2011. The statutory language imposing the enablement requirement, however, remains largely unchanged. Section 4888 of the Revised Statutes required inventors to file

> a written description of [the invention], and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains . . . to make, construct, compound, and use the same.[185]

The language of the 1952 Patent Act and 2011 America Invents Act tracks the language of the Revised Statutes essentially verbatim.[186] Courts presume that Congress maintains the same meaning when reenacting the same language—as the Supreme Court noted, "reenacting precisely the same language would be a strange way to make a change."[187] Further, the Court routinely relies on pre-1952 case law when evaluating challenges under the patent laws.[188] Finally, the Supreme Court has not overruled *Incandescent Lamp*—nor has any court at any level ever questioned the case.[189]

Third, one could argue that "undue experimentation" was an organic growth from the *Hyde* decision—that is, that the Court implicitly intended *Hyde* to limit *Incandescent Lamp*. Yet, that is not how the Supreme Court understood *Hyde*. Instead, later Supreme Court cases cited *Hyde* for the proposition that commercial success could indicate invention

[183] Brief for Appellee, supra note 43, at 257.

[184] *Incandescent Lamp*, 159 U.S. at 474.

[185] 1 Rev. Stat. § 4888 (1878).

[186] Compare id. (setting parameters for the specification), with 35 U.S.C. § 112 (1952), and 35 U.S.C. § 112(a) (2012) (stipulating same).

[187] Pierce v. Underwood, 487 U.S. 552, 567 (1988).

[188] See, e.g., Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120, 2128–30 (2014) (relying on pre-1952 cases when analyzing the written description requirement); Bilski v. Kappos, 560 U.S. 593, 602 (2010).

[189] In Westlaw, zero cases give *Incandescent Lamp* "Negative Treatment." This information was compiled by finding *Incandescent Lamp* in Westlaw and clicking the "Negative Treatment" tab.

(that is, nonobviousness),[190] but never cited *Hyde* when discussing enablement.[191] *Angstadt* is the first case where the CCPA cites *Hyde* for the undue experimentation standard, although numerous previous CCPA cases articulated the standard without citation.[192] The CCPA decided *Angstadt* in 1976[193]—more than twenty years after the first CCPA case requiring undue experimentation.[194] That *Hyde* was introduced so long after the first articulation of the standard may indicate that reliance on *Hyde* was a later-developed justification, rather than an organic growth.

Even as a later justification, *Hyde* may not even be relevant to determining whether a specification is enabling. In *Hyde*, the Court is unclear whether its paragraph regarding "preliminary testing" applies to the specification or the claims.[195] The standard for determining claim definiteness is different than the standard for determining enablement, because the two requirements perform two different functions. While the function of the specification is to teach others how to make and use the invention, the purpose of the claims is to particularly point out and distinctly claim what the applicant regards as his invention, so that others have notice regarding the patentee's legal rights.

Commentators did not unanimously believe that *Hyde* affected enablement. A 1943 treatise cites *Hyde*, but for the purposes of identifying who can be an inventor, rather than for enablement.[196] A 1929 treatise understood *Hyde* to apply to the claims, not the specification, citing it only for the proposition that the "prior state of the art, to which an invention belongs, must be considered in construing any claim for that invention."[197]

[190] Goodyear Tire & Rubber Co. v. Ray-O-Vac Co., 321 U.S. 275, 279 n.5 (1944); Saranac Auto. Mach. Corp. v. Wirebounds Patents Co., 282 U.S. 704, 709 (1931).

[191] See *Goodyear*, 321 U.S. at 279; *Saranac*, 282 U.S. at 709–11; Minerals Separation N. Am. Corp. v. Magma Copper Co., 280 U.S. 400, 402 (1930); Minerals Separation v. Butte & Superior Mining Co., 250 U.S. 336, 350 (1919). Until the 2013–14 Term, those four cases were the only times that the Supreme Court cited *Hyde*. This information was compiled by finding *Hyde* in Westlaw, clicking the "Citing References" tab, and filtering by Supreme Court cases. As will be explained later in this Part, the Supreme Court's recent use of *Hyde* indicates that *Hyde* is in fact not relevant to enablement.

[192] See, e.g., In re Honn, 364 F.2d 454, 461 (C.C.P.A. 1966); In re Gay, 309 F.2d 769, 774 (C.C.P.A. 1962); In re Tomlinson, 220 F.2d 766, 768 (C.C.P.A. 1955).

[193] 537 F.2d 498, 503–04 (C.C.P.A. 1976).

[194] See *Tomlinson*, 220 F.2d at 768 (decided in 1955).

[195] That is, the Court is unclear whether the statement applies to the enablement requirement or the claim definiteness requirement. See *Hyde*, 242 U.S. at 270–71.

[196] Chester H. Biesterfeld, Patent Law for Chemists, Engineers and Students 27 (1943).

[197] 1 Albert H. Walker, A Treatise on the Law of Patents for Inventions 314 (6th ed. 1929).

Even authors who viewed *Hyde* as applying to enablement, however, did not view it as overruling *Incandescent Lamp*. A 1935 treatise cited *Hyde* for the proposition that "[a] disclosure is sufficient, even though some preliminary experimenting in the nature of control tests is required."[198] However, that treatise also states that "[t]he disclosure must be full and exact enough to permit the invention to be practiced satisfactorily without resorting to further experimentation."[199] Even in the 1960s, *Hyde* was understood to mean that "[t]he disclosure does not have to be detailed as to every last fact," but "[t]hat *limited* experimentation may still be necessary does not render the specification insufficient."[200] At least one treatise viewed *Hyde* as applying to both enablement and claim definiteness, citing *Hyde* both for the proposition that "the certainty [of the specification] which the law requires in patents is not greater than is reasonable, having regard to their subject matter,"[201] and that if a process

> because of the varied character of the subject-matter, necessarily requires preliminary tests by the user to apply it most successfully . . . [it] is not on that account invalid, if the process is described in the claims with sufficient definiteness to guide those skilled in the art to a successful use of it.[202]

The Supreme Court recently resolved the ambiguity regarding *Hyde*. In *Nautilus, Inc. v. Biosig Instruments, Inc.*—a case decided during the 2013–14 Term—the petitioner argued that *Hyde* is an enablement case,[203] while the respondent argued that *Hyde* applied to claim definiteness.[204] *Nautilus* addressed only the standard required for claim definiteness—enablement was not at issue.[205] In *Nautilus*, the Court cites *Hyde* exactly once, for the proposition that "the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-

[198] Leon H. Amdur, Patent Law and Practice 196 (1935).
[199] Id. at 195.
[200] Robert Calvert, The Encyclopedia of Patent Practice and Invention Management 151 (1964) (emphasis added).
[201] Beirne Stedman, Patents 223 (1939).
[202] Id. at 232.
[203] Reply Brief for Petitioner, Nautilus, Inc. v. Biosig Instruments, Inc., 134 S. Ct. 2120 (2014) (No. 13-369), 2014 WL 1430767 at *14 n.4 (Apr, 14, 2014) (stating that *Hyde* "appears to have focused on *enablement*").
[204] Brief for Respondent, *Nautilus*, 134 S. Ct. 2120 (No. 13-369), 2014 WL 1260426 at *25–26 (Mar. 26, 2014).
[205] See *Nautilus*, 134 S. Ct. at 2124.

matter."[206] The Court does not explicitly state whether it views *Hyde* as applying to enablement or claim definiteness. The context of the citation, however, indicates that the Court accepted that *Hyde* applies to claim definiteness only. The citation appears in a paragraph with the stated intention of "determin[ing] the proper office of the definiteness command[,]" and the Court cites *Hyde* to support its reading of Title 35 of the U.S. Code, Section 112, Paragraph 2—the paragraph in which claim definiteness, but not enablement, appears.[207] In *Nautilus*, then, the Court seems to signal that the holding of *Hyde* applies to claim definiteness, but not to enablement. Resolving *Hyde* in this manner removes the only Supreme Court case cited in support of undue experimentation. So, rather than representing a natural growth from a "without experimentation" enablement standard to an "undue experimentation" standard, *Hyde* addresses an entirely different doctrine.

Even if *Hyde* does apply to enablement—which was not clear at the time and appears incorrect in light of *Nautilus*—the words "undue experimentation" do not appear in *Hyde*.[208] Instead, *Hyde* stated that the fact that "preliminary tests must be made to determine . . . [how] to obtain the best results" does not render the patent invalid.[209] The Supreme Court stated that "it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case."[210] Instead, the patent needed only to be "sufficiently definite to guide those skilled in the art to its successful application."[211] The Court does not seem to conceive of these preliminary tests as experimentation—it does not claim to overrule *Incandescent Lamp*, and does not cite *Incandescent Lamp* at all.[212]

Fourth, one could argue that the two standards are actually the same—that the Court in *Incandescent Lamp* articulated the same standard that the Federal Circuit did in *Wands*, but simply used different language because the Court decided the case in a different era. The Federal Circuit decided *Wands* almost one hundred years after *Incandescent*

[206] Id. at 2129 (quoting *Hyde*, 242 U.S. 261).
[207] Id.
[208] See *Hyde*, 242 U.S. at 261.
[209] Id. at 270.
[210] Id. at 271.
[211] Id.
[212] See id. Lower courts did not view *Hyde* as overruling *McKeesport* either. See, e.g., M. Swift & Sons v. W.H. Coe Mfg. Co., 102 F.2d 391, 395–96 (1st Cir. 1939).

Lamp, and "[w]ords and phrases can change meaning over time."[213] Determining whether the Supreme Court and the Federal Circuit articulated the same standard depends on how each case defines experimentation.

Unfortunately, the Supreme Court did not provide an explicit definition of experimentation in *Incandescent Lamp*. The Court did provide some statements, however, which provide clues to what "experimentation" means. Because the Court invalidated Sawyer and Man's patent, we know that a specification requiring "an examination of over six thousand vegetable growths" required experimentation and thus did not meet the enablement requirement.[214] The Court mentioned "experiments" two other times: when speaking of "experiments made . . . by Mr. Edison and his assistants . . . for the purpose of ascertaining the [material] best adapted to an incandescent conductor,"[215] and when noting that Edison, "while experimenting with a bamboo strip . . . obtained surprising results."[216] By contrast, the Court also stated that Sawyer and Man "might properly have" claimed only "carbonized paper"[217]—implying that whatever effort was required to optimize carbonized paper as an incandescent conductor did not amount to experimentation.

The theme running through those articulations is whether the person reading the patent would know the result of any investigations that he performed based on the patent. A person making a lamp of carbonized paper would know that the lamp would work, because the patent said as much. By contrast, when Edison and his assistants performed experiments, they did not know which material they tested would be "best adapted to an incandescent conductor."[218]

This also may explain the Court's statement that "[i]f [Sawyer and Man] had discovered in fibrous and textile substances a quality common to them all, or to them generally, as distinguishing them from other materials . . . and such quality or characteristic adapted them peculiarly to incandescent conductors, such claim *might* not be too broad."[219] If there really were a quality common to all of the materials which made them good conductors, then a person reading the patent and performing fur-

[213] Victor v. Nebraska, 511 U.S. 1, 13 (1994).
[214] *Incandescent Lamp*, 159 U.S. at 472.
[215] Id. at 472–73.
[216] Id. at 473.
[217] Id. at 472.
[218] Id. at 473.
[219] Id. at 472 (emphasis added).

ther research would know that by using any of the materials they could make a successful lamp. If the person reading the patent would not know, from the face of the patent, whether the material would be successful, then the person must perform independent tests to determine what, in fact, the patent teaches and covers.

The *Wands* definition seems similar, but subtly different. While also concerned with knowledge, *Wands* focused on knowledge of the process that leads to the results, rather than knowledge of the results themselves. For example, *Wands* noted that the materials were tested using "commercially available . . . kit[s]"[220] and that the screening techniques were "well known" in the relevant art.[221] The Federal Circuit reiterated seven times that the methods used to test the materials are well known,[222] and argued that "there ha[d] been no claim that the [method] should be more difficult or unreliable" in the circumstances considered by the patent.[223] In concluding that the specification did not require undue experimentation, the Federal Circuit stated that "all of the methods needed to practice the invention were well known."[224] The Federal Circuit seems less focused, however, on the results of the tests.[225] Indeed, the Federal Circuit notes that "[e]ven if we were to accept the PTO's 2.8% success rate [of the applicant's tests], we would not be required to reach a conclusion of undue experimentation."[226]

Wands thus applied a different, easier-to-meet meaning of "experimentation" than *Incandescent Lamp*. In *Incandescent Lamp*, a patent does not require experimentation if a person reading the patent would know the results of testing from the face of the patent. In *Wands*, a patent does not require undue experimentation if a person reading the patent would know how to perform the tests, even if they would be unsure of the ultimate result. Unlike *Incandescent Lamp*, lack of experimentation in *Wands* seems to mean that the *process* for investigating the invention was known, rather than the *results* of the investigation itself.

[220] *Wands*, 858 F.2d at 738.
[221] Id.
[222] See id. at 736 (three times); id. at 738 (once); id. at 739 (once); id. at 740 (twice).
[223] Id. at 740.
[224] Id.
[225] Though there is language that indicates that the likelihood of obtaining the desired results may be relevant. For example, the Federal Circuit indicates that while the first four attempts by the inventors were failures, they succeeded six times without failure once they became "skilled in the art." Id. at 739.
[226] Id. at 739 n.29.

While the CCPA argues in *Angstadt* that it would be "impracticable and unreasonable" for a patent "to make everything predictable in advance,"[227] that seems to be exactly what the Supreme Court envisions.

One could respond that *Hyde*, if it applies to enablement, represents a limitation of *Incandescent Lamp*'s principle. Yet *Hyde* does not resolve the tension between the two approaches. Recall that *Hyde* found that the fact that "preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results" did not mean that the specification required experimentation.[228] This standard seems consistent with *Incandescent Lamp*: The tester knows that the tests will work, but still needs to determine which test will work best. *Hyde* seems further from *Wands*—the tests performed in *Wands* determined not which material worked the best, but rather which material worked *at all*. Assuming that *Hyde* applies to enablement, it seems merely to establish another data point in determining what the Court views as "experimentation," though *Hyde* does not cite *Incandescent Lamp* or the experimentation standard.[229] So, Supreme Court precedent does not allow experimentation, though it does allow preliminary testing. The focus is on what a person reading the application must do to replicate the invention. *Hyde* allows the teachings of a patent to require some fine-tuning, as long as a person can make the invention. If the patent requires experiments to determine how to make the invention work *at all*, however, then the patent is invalid under the *Incandescent Lamp* standard.

The tension between the two standards can be illustrated by applying the standard in *Wands* to the facts of *Incandescent Lamp*. To determine which fibrous materials could be used as incandescent conductors, a researcher would simply need to swap out the material used as the incandescent conductor for a different material.[230] The process for testing seems to have been well known, as in *Wands*, and seems mechanically easier to apply than the *Wands* testing method. The process-based *Wands* approach, then, seems to direct that Sawyer and Man's patent in *Incandescent Lamp* be upheld—the opposite of the Supreme Court's conclusion.

[227] 537 F.2d at 504.
[228] *Hyde*, 242 U.S. at 270.
[229] See id.
[230] *Incandescent Lamp*, 159 U.S. at 472–74.

Apparent inconsistency is not the only reason that enablement is ripe for review at the Supreme Court. Recall that, in *Incandescent Lamp*, the Court expressed concerns about allowing Sawyer and Man to preempt an entire field of research and thereby prevent others from discovering better-functioning solutions.[231] In *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, the Court invalidated a patent because it would inhibit future development of improved innovations.[232] Thus, the current Court seems concerned about exactly the same issues that led the Court to invalidate Sawyer and Man's patent in *Incandescent Lamp*. Given that concern, arguing that "undue experimentation" can preempt fields of research by allowing premature patents seems likely to encourage further review.

CONCLUSION

The Federal Circuit currently uses "undue experimentation" analysis to determine whether a patent meets the enablement requirement. That standard is inconsistent with Supreme Court precedent. *Incandescent Lamp* establishes that a patent must enable the invention to be practiced *without* experimentation, though some preliminary testing may be allowed. As the undue experimentation standard has never been endorsed by the Supreme Court, and *Incandescent Lamp* has never been overruled or criticized, *Incandescent Lamp* provides an important tool for patent litigators seeking to invalidate patents which may preempt research into emerging fields.

[231] Id. at 474.
[232] 132 S. Ct. 1289, 1303 (2012).