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The Lost Precedent of the Reverse Doctrine of Equivalents

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The Lost Precedent of the Reverse Doctrine of Equivalents

*Samuel F. Ernst**

ABSTRACT

Proponents of legislative patent reform argue that the current patent system perversely impedes true innovation in the name of protecting a vast web of patented inventions, the majority of which are never even commercialized for the benefit of the public. Opponents of such legislation argue that comprehensive, prospective patent reform legislation would harm the incentive to innovate more than it would curb the vexatious practices of non-practicing entities. But while the "Innovation Act" wallows in Congress, there is a common law tool to protect innovation from the patent thicket lying right under our noses: the reverse doctrine of equivalents. Properly applied, this judge-made doctrine can be used to excuse infringement on a case-by-case basis if the court determines that the accused product is substantially superior to the patented invention, despite proof of literal infringement. Unfortunately, the reverse doctrine is disfavored by the Court of Appeals for the Federal Circuit and therefore rarely applied. It was not always so. This Article is the first comprehensive study of published opinions applying the reverse doctrine of equivalents to excuse infringement between 1898, when the Supreme Court established the doctrine, and the 1982 creation of the Federal Circuit. This "lost precedent" reveals a flexible doctrine that takes into account the technological and commercial superiority of the accused product to any embodiment of the patented invention made by the patent-holder. An invigorated reverse doctrine of equivalents could therefore serve to protect true innovations from uncommercialized patents on a case-by-case basis, without the potential harm to the innovation incentive that prospective patent legislation might cause.

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I. INTRODUCTION

A. *The Need to Promote Progress and Not Mere Invention*

The Constitution empowers Congress to grant intellectual property rights “[t]o promote the Progress of Science and useful Arts.”¹ But how do we define the “Progress” that society is entitled to receive in exchange for the patent monopoly? Does “Progress” refer merely to patented *inventions*, whether or not they are ever made or used? Or does “Progress” refer to *innovation*—fully developed products or processes made available for the benefit of the public.² Proponents of patent reform argue that due to vexatious patent litigation, patents work perversely to impede true innovation in the name of protecting a vast thicket of patented inventions, the majority of which are never commercialized.³ This concern is echoed in modern patent theory, the various schools of which are concerned with the value society receives in exchange for granting patent monopolies beyond the eventual use of the claimed inventions—what this author has called “unclaimed consideration.”⁴ Commercialization theory, in particular, stands for the proposition that the patent system should encourage the full

1. U.S. CONST. art. I, § 8, cl. 8.

2. This Article defines the difference between “innovation” and “invention” as articulated by Professor Robert Merges:

An *invention* refers to the practical implementation of an inventor’s idea. This often takes the form of a prototype or model. An invention, then, is more than a concept (it is usually a tangible thing), but less than the fully worked out product or process first offered for sale to customers. An *innovation* is the ‘debugged’ and functional version of the invention; the version first offered for sale.

Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 803, 807 (1988) (emphases in original).

3. See generally MICHELE BOLDRIN & DAVID K. LEVINE, *AGAINST INTELLECTUAL MONOPOLY* (Cambridge Univ. Press 2009); Walter Frick, *Patents are Eating the World and Hurting Innovation*, HARV. BUS. REV. (June 26, 2014), <http://hbr.org/2014/06/patents-are-eating-the-world-and-hurting-innovation/> [<https://perma.cc/ULU8-7XVN>]; Press Release, Software & Info. Indus. Ass’n, *SIIA Applauds Innovation Act: Calls it an Important, Bipartisan Patent Reform Effort* (July 29, 2015), <http://www.siia.net/Press/SIIA-Appraises-Innovation-Act-Calls-it-an-Important-Bipartisan-Patent-Reform-Effort> [<https://perma.cc/2V2E-HZAK>]. The claims of less than half of all patents are ever commercialized and only about 5 percent of patents are ever licensed for a royalty. See Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 362 (2010).

4. See Samuel F. Ernst, *Protecting the Boundaries: Unclaimed Consideration in the Patentee’s Social Contract*, 18 TUL. J. OF TECH. & INTELL. PROP. 1, 1 (2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2577925 [<https://perma.cc/XD2S-95XG>]. The schools of patent theory discussed in this Article are commercialization theory, disclosure theory, patent race theory, and patent signaling theory. See discussion *infra* Part III.

commercialization and marketing of new products and not just new inventions.⁵

This concern is not new, however; it is as old as the Constitution itself. Thomas Jefferson was dubious of the proposition that patent monopolies benefited society sufficiently to justify the harm they caused. Jefferson wrote to James Madison:

[I]t is better . . . to abolish . . . Monopolies, in all cases, than not to do it in any The saying there shall be no monopolies lessens the incitements to ingenuity, which is spurred on by the hope of a monopoly for a limited time, as of 14 years; but the benefit even of limited monopolies is too doubtful to be opposed to that of their general suppression.⁶

Madison also shared this concern about the danger of patent monopolies, writing:

In all cases of monopoly, not excepting those in favor of Authors & inventors, it would be well to reserve to the State, a right to extinguish the monopoly by paying a specified and reasonable sum. This would guard against the public discontents resulting from the exorbitant gains of individuals, and from the inconvenient restrictions combined with them.⁷

Accordingly, the Constitutional Convention imposed a limitation on Congress's intellectual property power: it must be exercised to promote "Progress," and not mere invention.⁸

The contemporary concern is that true innovators, who incur the risk and expend the investment not only necessary to describe a new invention but also to perfect it, promote it, and bring it to market, are taxed by the vexatious assertion of "paper patents"—patents that have not even been commercialized. Non-practicing patent assertion entities imposed litigation costs on defendants of \$29 billion in 2011 alone with their paper patents.⁹ This figure neither includes the indirect costs of litigation, such as the expense of engineer assistance in collecting discovery, giving depositions, investigating noninfringement and invalidity defenses, and other tasks

5. See Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 711 (2012) ("Commercialization theory . . . hypothesizes that we grant patents in order to encourage not invention but product development . . .").

6. Letter from Thomas Jefferson to James Madison (July 31, 1788), <http://founders.archives.gov/documents/Madison/01-11-02-0147> [<https://perma.cc/VR8M-7H9K>].

7. Detached Memoranda from James Madison on Banks (Jan. 31, 1820), <http://founders.archives.gov/?q=%22grants%20of%20this%20sort%20can%20be%20justified%20in%20very%20peculiar%20cases%20only%22&s=1111311111&sa=&r=1&sr=> [<https://perma.cc/T5N3-8HST>].

8. Dotan Oliar, *Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress's Intellectual Property Power*, 94 GEO. L.J. 1771, 1810–16 (2006) (arguing that the Framers intended the "promote the Progress" clause to serve as a limitation on Congress's intellectual property power).

9. James Bessen & Michael J. Maurer, Essay, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 408 (2014).

necessitating specialized knowledge, nor the jobs that could be preserved or created with the money spent on defending litigation. Additionally, this figure does not consider the substantial amount of royalties paid to patent holders in licensing negotiations to avoid the prospect of costly litigation.¹⁰

B. The Common Law Solution: The Reverse Doctrine of Equivalents

Legislative patent reforms to address these problems have endured a long purgatory in Congress.¹¹ But judges traditionally had an ideal tool to address this problem: the reverse doctrine of equivalents. In a typical case, an accused product that meets each of the claim limitations of the patent-in-suit does not avoid infringement on the basis that additional features or improvements are added to the claimed invention.¹² But in the 1898 case *Boyden Power-Brake Co. v. Westinghouse*, the Supreme Court held that even if an accused product falls literally within the words of an asserted patent claim, the judge may determine that the accused product is so far changed in principle from the patented invention that it should escape infringement.¹³ In making this determination, the Court looked beyond the words of the claims to compare the principal of the patented invention to the accused product.¹⁴ Not only did the Court consider that the accused improvement was technologically superior to the patented invention, it also recognized the accused improvement's comparative commercial success:

We are induced to look with more favor upon this device, not only because it is a novel one, and a manifest departure from the principle of the Westinghouse patent, but because it solved at once, in the simplest manner, the problem of quick action, whereas the Westinghouse patent did not prove to be a success until certain additional members had been incorporated into it.¹⁵

10. See *id.* at 409; see also Samuel F. Ernst, *Introduction to the Chapman Law Review Symposium: Trolls or Toll-Takers: Do Intellectual Property Non-Practicing Entities Add Value to Society?*, 18 CHAPMAN L. REV. 611, 611 (2015).

11. For example, the "Innovation Act," H.R. 9, which is aimed at curbing abusive patent litigation, was removed from House floor consideration again last summer. See Dennis Crouch, *Patent Reform Slows Down in Congress*, PATENTLY-O (July 15, 2015), <http://patentlyo.com/patent/2015/07/patent-reform-congress.html> [<https://perma.cc/WK49-DFVZ>].

12. *Stiftung v. Renishaw PLC*, 945 F.2d 1173, 1178 (Fed. Cir. 1991) ("It is fundamental that one cannot avoid infringement merely by adding elements if each element recited in the claims is found in the accused device. For example, a pencil structurally infringing a patent claim would not become noninfringing when incorporated into a complex machine that limits or controls what the pencil can write.").

13. *Boyden Power-Brake Co. v. Westinghouse*, 170 U.S. 537, 568 (1898).

14. *Id.* at 569–71.

15. *Id.* at 572.

The defendant's automatic train brake avoided infringement of the plaintiff's patent even though it fell within the literal scope of the claims because it was technologically and commercially superior—technologically superior insofar as it solved the problem in the art in a way that the patented invention failed to do and commercially superior insofar as it was commercially more successful than the patentee's commercial product.¹⁶

This defense to patent infringement became known as the “reverse doctrine of equivalents” in the wake of a 1950 Supreme Court case, *Graver Tank & Manufacturing Company v. Linde Air Products Company*, in which the Court again recognized the doctrine, this time in dictum:

The wholesale realism of this doctrine [of equivalents] is not always applied in favor of a patentee but is sometimes used against him. Thus, where a device is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way, but nevertheless falls within the literal words of the claim, the doctrine of equivalents may be used to restrict the claim and defeat the patentee's action for infringement.¹⁷

C. The Federal Circuit and the Death of the Reverse Doctrine of Equivalents

The doctrine has been favored by scholars¹⁸ but frowned upon by the Court of Appeals for the Federal Circuit, the circuit court created in 1982 to wield nationwide appellate jurisdiction over patent disputes. In *Tate Access Floors, Inc. v. Interface Architectural Resources, Inc.*, the court referred to the reverse doctrine of equivalents as an “anachronistic exception, long mentioned but rarely applied.”¹⁹ The court asserted in dictum that the doctrine was no longer necessary to cabin claims to their equitable scope, because “when Congress enacted 35 U.S.C. § 112, after the decision in *Graver Tank*, it imposed requirements for the written description, enablement, definiteness, and means-plus-function claims that are

16. *Id.* at 569–71.

17. *Graver Tank*, 339 U.S. at 608–09. The term may have originated with Charles F. Pigott, Jr., who called the doctrine “equivalents in reverse.” Charles F. Pigott, Jr., *Equivalents in Reverse*, 48 J. PAT. OFF. SOC'Y 291 (1966).

18. See, e.g., Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1024–29 (1997) (arguing that copyright law unfortunately lacks a doctrine akin to patent law's reverse doctrine of equivalents to protect radical improvers); Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75, 94–95 (1994) (arguing that the reverse doctrine of equivalents is justified as a solution to situations where bargaining breakdown between patent holders and innovators of substantial improvements to patented inventions results in social welfare cost).

19. *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1368 (Fed. Cir. 2002).

co-extensive with the broadest possible reach of the reverse doctrine of equivalents.”²⁰ In *Roche Palo Alto LLC v. Apotex, Inc.*, the court similarly noted that “[t]he reverse doctrine of equivalents is rarely applied, and this court has never affirmed a finding of noninfringement under the reverse doctrine of equivalents.”²¹ After its inception in 1982, the court began the practice of reversing or vacating district court decisions finding noninfringement under the reverse doctrine of equivalents.²²

D. The Lost Precedent of the Reverse Doctrine of Equivalents

The Federal Circuit’s characterization of the reverse doctrine of equivalents is incorrect on multiple points. In the years between 1898, when the Supreme Court applied the doctrine in *Boyden v. Westinghouse*, and the 1982 creation of the Federal Circuit, the reverse doctrine of equivalents was applied with some regularity (although not frequently) by the federal courts to excuse literal infringement. These cases, particularly the pre-*Graver Tank* precedent, go uncited and forgotten, perhaps because they omit the later-coined name for the doctrine upon which they rely: the “reverse doctrine of equivalents.”²³

This is the first Article to study in a comprehensive way the pre-*Graver Tank* published cases that rely on the doctrine of *Boyden v. Westinghouse* to excuse infringement.²⁴ The doctrine is revealed as a

20. *Id.*

21. *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008).

22. *Smithkline Diagnostics, Inc. v. Helena Labs. Corp.*, 662 F.Supp. 622, 628 (E.D. Tex. 1987), *rev’d*, 859 F.2d 878, 889 (Fed. Cir. 1988) (reversing noninfringement under the reverse doctrine of equivalents because “hemoglobin does not operate in a substantially different way from the compounds claimed—which include hemoglobin—and we reject Helena’s argument based on the reverse doctrine of equivalents”); *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 591 F. Supp. 464, 471 (N.D. Cal. 1984), *rev’d* 775 F.2d 1107, 1122–23 (Fed. Cir. 1985) (en banc) (vacating summary judgment of noninfringement under the reverse DOE and remanding for trial “[b]ecause in this case there is a genuine issue of material fact respecting whether MEI’s filter and camera structure is so far changed in principle that it performs the same or a similar function in a substantially different way . . .”).

23. See cases cited *infra* notes 43–50 for examples of cases that rely on the reverse doctrine of equivalents but do not call it by that name. As noted above, the term may have been coined by Robert J. Pigott, Jr. in 1966. See Pigott, *supra* note 17, at 296. One of the earliest cases to employ the term “reverse equivalents” is a 1969 case, *Ansul Co. v. Uniroyal, Inc.*, 301 F. Supp. 273 (S.D.N.Y. 1969), although it is not clear that this case is, in fact, referring to the reverse doctrine of equivalents. *Id.* at 289 (“Consequently, what may be called the doctrine of ‘reverse equivalents,’ under which the broader claim includes the lesser subject matter, would apply in this case to place the uses of the composition on these latter plants within the patent’s protection.”). Another early case to use the term is *Application of Hogan*, 559 F.2d 595, 607 (C.C.P.A. 1977) (“[T]he judicially-developed ‘reverse doctrine of equivalents,’ . . . may be safely relied upon to preclude improper enforcement against later developers.”).

24. See *infra* Part II.

flexible doctrine that takes into account not only the equitable scope of the asserted patent claims, but also an assessment of the accused device, including whether it enjoys commercial success lacking in any embodiment of the patented invention.²⁵ As such, the reverse doctrine of equivalents takes into account the value of innovation effort and success to society in a way that is highly compatible with not only commercialization theory, but also other patent theories that value consideration received by society in return for the patent grant that goes beyond the scope of patent claims.

Part II further discusses how these pre-Federal Circuit cases do not treat the doctrine as a rare or disfavored doctrine,²⁶ or—as scholars have phrased it—a doctrine reserved only for “radical improvements.”²⁷ To the contrary, the Second, Sixth, and Ninth Circuits required the district court to *always* consider reverse equivalents prior to determining infringement as part of the affirmative infringement case.²⁸ Moreover, the standard was whether the accused product was “substantially changed” from the patented invention; there was no requirement that it constitute a “radical improvement.”²⁹ Indeed, the concept of a “radical improvement” appears to have originated in scholarly articles, not in the case law.³⁰

Part II goes on to discuss that this early precedent does not apply the doctrine in a manner duplicative of the enablement and written description requirements of the 1952 Patent Act, as the Federal Circuit asserted in the *Tate Access Floors* case.³¹ There are a handful of cases that invoke the doctrine as a type of narrow claim construction, limiting the claims to the preferred embodiments. But most of these cases involve a comparison of the patent disclosure (or even the patent-holder’s commercial embodiment) to the accused improvement on the patented invention to determine if the improver has substantially improved upon the patented invention. Accordingly, the Federal Circuit’s statement in *Tate Access Floors* that the doctrine

25. In referring to the “embodiment” of an invention, I am referring to any product or reduction to practice that the patent holder has made of the invention claimed in the patent.

26. See, e.g., *Tate Access Floors*, 279 F.3d at 1368 (stating that the reverse doctrine of equivalents is an “anachronistic exception, long mentioned but rarely applied”).

27. See, e.g., *Merges*, *supra* note 18, at 93–94 (“[B]ecause the doctrine is still good law, a pioneer always has some risk that a court will excuse a radical improvement from infringement despite the fact that it is clearly covered by the patentee’s claims.”)

28. See *infra* Section II.C.

29. See *infra* Section II.D.

30. *Id.*

31. *Tate Access Floors*, 279 F.3d at 1368.

has been rendered superfluous by the 1952 codification of the written description and enablement defenses is incorrect.³²

The Article proceeds, in Part III, to tie the reverse doctrine of equivalents as properly understood to modern theories of patent scholarship—commercialization theory, patent race theory, disclosure theory, and signaling theory—which, by and large, conclude that a primary or substantial consideration society receives in exchange for the patent monopoly are improvements, information, and commercialization beyond the scope of patented inventions. A revitalized reverse doctrine of equivalents would be a useful reform to the patent system because it provides a defense to accused infringers who can prove that they have provided society with substantial “unclaimed consideration” in the form of commercialized improvements of the patented invention.

The Article concludes in Part IV by examining ways in which the reverse doctrine of equivalents might be reformed and refined to serve as a more attractive and effective judicial tool. The doctrine should not be rare or reserved for “radical improvements.” Because the doctrine is simply the doctrine of equivalents in reverse, it should also measure “substantial difference.”³³ Moreover, the doctrine should excuse equivalent infringement, and not just literal infringement.³⁴

One problem with the reverse doctrine of equivalents as currently articulated is that it offers amorphous and undefined standards that may be unattractive to judges inclined to formalism;³⁵ the court must determine whether the accused infringer has created a product that is “so far changed in principle from a patented article” as to be “substantially different.”³⁶ The doctrine would benefit by a clear and detailed legal standard related to its policies, leading to predictable results and ease of judicial application. This Article recommends that in addition to examining the accused product’s technological change from the patented invention, courts should also

32. See *infra* Section II.E. The enablement and written description defenses are codified at 35 U.S.C. § 112(a) (2014) as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

35 U.S.C. § 112(a) (2014).

33. See *infra* Section IV.A.

34. See *infra* Section IV.B.

35. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1673 (2003) (citing John R. Thomas, *Formalism at the Federal Circuit*, 52 AM. U. L. REV. 771, 772–73 (2003)).

36. *Graver Tank*, 339 U.S. at 608.

compare the commercial success of the accused product to any product manufactured by the patent-holder. Such a factor would empower the reverse doctrine of equivalents as a policy tool to encourage innovation, not just invention.³⁷

To forestall concerns that the doctrine would unfairly reward financially advantaged companies that have the capital to create a successful product through marketing and other non-technical innovations, courts can impose a nexus requirement. Specifically, the accused infringer would be required to show that there is a nexus between the required commercial success of the accused product and the substantial technological improvement it offers. This comparison of the technological and commercial success of the accused product to that of any embodiment of the patented invention would be particularly effective in curbing vexatious litigation brought by non-practicing entities that do not, after all, produce a commercial product.³⁸

The doctrine would also allow courts to implement reform on a case-by-case basis, weighing the equities of the particular parties before them. Accordingly, this judicial reform would address the concerns of opponents of legislative patent reform who argue that comprehensive, prospective legislation could harm innovation in unpredictable ways. For these reasons, this Article argues that the reverse doctrine of equivalents may be the patent reform that is lying right under our noses. And it can be grounded in precedent: the lost precedent of the reverse doctrine of equivalents.³⁹

II. THE LOST PRECEDENT OF THE REVERSE DOCTRINE OF EQUIVALENTS

One common misunderstanding with respect to the reverse doctrine of equivalents is that it has been uniformly disfavored and rarely, if ever, invoked since the Supreme Court applied it in *Boyd v. Westinghouse*. The Federal Circuit has called it an “anachronistic exception, long mentioned but rarely applied.”⁴⁰ But this author’s review of the published case law reveals that courts have found or affirmed noninfringement under the reverse doctrine of equivalents at

37. See *infra* Section IV.C.

38. *Id.*

39. *Id.*

40. *Tate Access Floors*, 279 F.3d at 1368. See also Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 118 (2004) (“Courts have applied the RDOE to excuse infringement very rarely, and not in the past century.”); Stephen M. Maurer, *Ideas Into Practice: How Well Does U.S. Patent Law Implement Modern Innovation Theory?*, 12 J. MARSHALL REV. INTELL. PROP. L. 644, 687 (2013) (“Strangely, most of what we know about the Doctrine still comes from the original *Westinghouse* opinion.”).

fairly regular (if infrequent) intervals in the decades following *Boyden*, leading all the way up to and past the 1982 founding of the Federal Circuit. Further, these cases do not suggest that the doctrine should be disfavored or rarely applied.⁴¹

*A. The Reverse Doctrine of Equivalents Was Regularly Applied
Between 1898 and 1988*

The Supreme Court found noninfringement under the reverse doctrine of equivalents in *Boyden* in 1898.⁴² Published opinions indicating a court's application of the doctrine to find or affirm noninfringement appear at least four times in the 1900s,⁴³ twice in the 1910s,⁴⁴ twice in the 1920s,⁴⁵ eight times in the 1930s,⁴⁶ twice in the 1940s,⁴⁷ once in the 1960s,⁴⁸ four times in the 1970s,⁴⁹ and seven times in the 1980s—with the Federal Circuit then emerging to reverse the

41. See also George M. Sirilla, Thomas P. Feddo, & Michael C. Antone, *The Doctrine of Equivalents: Both a Sword and a Shield*, 13 FED. CIR. B.J. 75, 83–84 (2003) (“During the time between the *Graver Tank* decision in 1950 and the creation of the Federal Circuit in 1982, numerous decisions of circuit courts of appeals, the Court of Claims, and district courts have applied the DOE as a shield to find no infringement of patent claims otherwise readable on the accused device or activity.”). Moreover, as this Article demonstrates, numerous decisions *prior to Graver Tank*—beginning with the Supreme Court’s 1898 decision in *Boyden*—found or affirmed noninfringement under the reverse doctrine of equivalents; these are cases that are often forgotten because the doctrine had not yet been so named.

42. *Boyden Power-Brake*, 170 U.S. at 573.

43. See *Duncan v. Cincinnati Butchers’ Supply Co.*, 171 F. 656, 665–66 (6th Cir. 1909); *Standard Computing Scale Co. v. Computing Scale Co.*, 126 F. 639, 649 (6th Cir. 1903); *General Elec. Co. v. Allis-Chalmers Co.*, 171 F. 666, 669 (D.N.J. 1909); *Severy Process Co. v. Harper & Bros.*, 113 F. 581, 584–86 (S.D.N.Y. 1902).

44. *Borland v. Northern Trust Safe Deposit Co.*, 212 F. 178, 184 (N.D. Ill. 1914); *American Stoker Co. v. Underfeed Stoker Co. of Am.*, 182 F. 642, 653 (W.D. Pa. 1910).

45. *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921); *Cadwell v. Firestone Tire & Rubber Co.*, 13 F.2d 483, 487 (E.D.N.Y. 1926).

46. *Craftmint Mfg. Co. v. Baker*, 94 F.2d 369, 373 (9th Cir. 1938); *British Acoustic Films, Ltd. v. Electrical Research Prods.*, 29 F. Supp. 531, 535–36 (D. Del. 1939); *General Elec. Co. v. Amperex Elec. Prods.*, 15 F. Supp. 438, 440 (E.D.N.Y. 1936); *Radio Corp. of Am. v. Mackay Radio & Tel. Co.*, 16 F. Supp. 610, 613–14 (E.D.N.Y. 1936); *T.H. Symington & Son, Inc. v. Symington Co.*, 9 F. Supp. 699, 708 (D. Md. 1935); *Cinema Patents Co. v. Warner Bros. Pictures, Inc.*, 55 F.2d 948, 956 (E.D.N.Y. 1932); *Esnault-Pelterie v. Chance Bought Corp.*, 56 F.2d 393, 405 (E.D.N.Y. 1932); *Baker Perkins Co. v. Thomas Roulston, Inc.*, 52 F.2d 799, 801 (E.D.N.Y. 1931).

47. *Wheeling Stamping Co. v. Standard Cap & Molding Co.*, 60 F. Supp. 533, 537 (D. Md. 1945); *Meikle v. Timken-Detroit Axle Co.*, 44 F. Supp. 460, 465 (E.D. Mich. 1942).

48. *Nickerson v. The Bearfoot Sole Co.*, 311 F.2d 858, 881 (6th Cir. 1963).

49. *Leesona Corp. v. U.S.*, 530 F.2d 896, 906 (Ct. Cl. 1976); *Harris v. NRM Corp.*, 1976 WL 21012 at *6 (N.D. Ohio 1976); *Keystone Plastics, Inc. v. C & P Plastics, Inc.*, 340 F. Supp. 55, 70 (S.D. Fla. 1972), *aff’d*, 506 F.2d 960, 965 (5th Cir. 1972); *Marvin Glass Co. & Assocs. v. Sears Roebuck & Co.*, 318 F. Supp. 1089, 1104 (S.D. Tex. 1970), *aff’d*, 448 F.2d 60, 61–62 (5th Cir. 1971).

district courts' conclusions in at least two instances.⁵⁰ These figures include six opinions by circuit courts of appeals and one opinion by the Court of Claims that constitutes binding Federal Circuit precedent.⁵¹ These numbers are conservative insofar as they only include cases that make a final finding of noninfringement under the doctrine or affirm such a finding. Not included in this count are additional cases favorable to the reverse doctrine of equivalents that deny or vacate summary judgment of infringement based on a dispute of fact with respect to whether the reverse doctrine of equivalents would result in noninfringement, including one such case from the Federal Circuit.⁵²

50. *Smithkline Diagnostics, Inc. v. Helena Labs. Corp.*, 662 F. Supp. 622, 628 (E.D. Tex. 1987), *rev'd*, 859 F.2d 878, 890 (Fed. Cir. 1988) ("Thus, hemoglobin does not operate in a substantially different way from the compounds claimed—which include hemoglobin—and we reject Helena's argument based on the reverse doctrine of equivalents."); *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 591 F. Supp. 464, 471 (N.D. Cal. 1984), *rev'd*, 775 F.2d 1107, 1122–23 (Fed. Cir. 1985) (en banc) (vacating summary judgment of noninfringement under the reverse DOE and remanding for trial "[b]ecause in this case there is a genuine issue of material fact respecting whether MEI's filter and camera structure is so far changed in principle that it performs the same or a similar function in a substantially different way . . ."); see, e.g., *Mead Dig. Sys., Inc. v. A.B. Dick Co.*, 723 F.2d 455, 462–64 (6th Cir. 1983); *Precision Metal Fabricators, Inc. v. Jetstream Sys. Co.*, 693 F. Supp. 814, 819 (N.D. Cal. 1988); *Technicon Instruments Corp. v. Alpkem Corp.*, 664 F. Supp. 1558, 1575 (D. Or. 1986), *aff'd*, 837 F.2d 1097, *1 (Fed. Cir. 1987); *Brenner v. Recognition Equip. Inc.*, 593 F. Supp. 1275, 1278 (S.D.N.Y. 1984); *Foster Wheeler Corp. v. Babcock & Wilcox Co.*, 512 F. Supp. 792, 801–02 (S.D.N.Y. 1981).

51. *Mead Digital Sys., Inc.*, 723 F.2d at 462–64; *Nickerson*, 311 F.2d at 881; *Craftmint Mfg. Co.*, 94 F.2d at 373; *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921); *Duncan v. Cincinnati Butchers' Supply Co.*, 171 F. 656, 665–66 (6th Cir. 1909); *Standard Computing Scale Co. v. Computing Scale Co.*, 126 F. 639, 649 (6th Cir. 1903); *Leesona Corp.*, 530 F.2d at 906. Nor is the Federal Circuit wholly accurate in its repeated statement that "[n]ot once has this court affirmed a decision finding noninfringement based on the reverse doctrine of equivalents." *Tate Access Floors*, 279 F.3d at 1368; see also *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008) ("[T]his court has never affirmed a finding of noninfringement under the reverse doctrine of equivalents."). In *Technicon*, the District Court for the District of Oregon considered whether a patent on a system for continuous flow analysis of blood and other body fluids was infringed by the defendant's improved instrument that added air bubbles to the sample stream. *Technicon*, 664 F. Supp. at 1562–63, 1565–66. The court held that the accused system was "very different in principle from the '593 patent" and that "[u]nder the reverse doctrine of equivalents, [one would] find the RFA-300 does not infringe the '593 patent." *Id.* at 1575. The Federal Circuit affirmed noninfringement in a non-published opinion that omits mention of the reverse doctrine of equivalents. *Technicon Instruments Corp. v. Alpkem Corp.*, 837 F.2d 1097, *1 (Fed. Cir. 1987).

52. See *Scripps Clinic & Research Found. v. Genentech, Inc.* 927 F.2d 1565, 1581 (Fed. Cir. 1991) ("Genentech argues that its product is equitably seen as changed 'in principle' . . . an assertion disputed by Scripps, but which if found to be correct could provide—depending on the specific facts of similarities and differences—sufficient ground for invoking the reverse doctrine."); see also *Jewish Hosp. of St. Louis v. Idexx Labs.*, 973 F.Supp. 24, 28 (D. Maine 1997) ("Having carried its burden of establishing a prima facie case on the reverse doctrine of equivalents, IDEXX has rendered summary judgment inappropriate on the whole blood product."); *Union Carbide Corp. v. Tarancon Corp.*, 682 F. Supp. 535, 542 (N.D. Ga. 1988) ("Furthermore, even if the court could find that the claim language reads clearly on defendants' accused apparatus, there would remain a question of fact whether defendants' apparatus

*B. The Lost Precedent of the Reverse Doctrine of Equivalents
Considered the Practical and Commercial Success of the Accused
Product*

This lost precedent of the reverse doctrine of equivalents applies the doctrine in a flexible manner that takes into account the relative technological and commercial successes of the accused product and any embodiment produced by the patent-holder. For example, the asserted patent in *Severy Process v. Harper & Brothers*⁵³ claimed a bed for the platen of a printing press (the plate that presses the paper against the type) composed of “elastic bristles or wires.”⁵⁴ The accused defendant achieved substantial practical and commercial success by manufacturing a platen out of “wire coils, interlocked, and held in place between two thin sheets of rubber,” whereas the patent-holder’s platens were a “lamentable failure.”⁵⁵ Rather than delving deeply into semiotic puzzling over whether “elastic bristles and wires” can be fairly construed to encompass wire coils, as a contemporary court would, the court stepped back to take a practical look at the situation of the litigants giving rise to the litigation:

Considered from a practical and commercial point of view two propositions are incontestably established by the proof. First. That the complainant’s blanket is a lamentable failure. Second. That the defendant’s blanket is a pre-eminent success. The Severy patent has been in existence for over six years and as late as October, 1900, the complainants had not succeeded in producing a successful commercial blanket. At that time they had, apparently, abandoned the device as shown in the specification and drawings and were experimenting with a blanket consisting of a thin sheet of brass The defendant’s blanket, though it was not put on the market until the autumn of 1898, was successful from the start. Large numbers of the devices are in actual use in various printing establishments and are paying royalty to the manufacturer⁵⁶

Hence, the court did not restrict its analysis to a determination of the technical differences between the patented invention and the accused product. Rather, the court found noninfringement under the reverse doctrine of equivalents based, in part, on a finding that the accused product was a greater commercial success than the patent holder’s product, which was a commercial failure.

The *Severy* court found noninfringement under *Boyden v. Westinghouse*, quoting that case for the proposition that

[t]he patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally

performs the fluorination function in a substantially different way than does plaintiff’s apparatus.”).

53. 113 F. 581, 582 (S.D.N.Y. 1902).

54. *Id.*

55. *Id.*

56. *Id.* at 583.

construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted when he has done nothing in conflict with its spirit and intent.⁵⁷

The court concluded with the observation that “it will not only be an injustice to the defendant and its licensors, but to the public as well, to compel them, and future improvers also, to pay tribute to the Severy patent.”⁵⁸

Hence, the *Severy* case exemplifies what the Supreme Court characterized in *Graver Tank* as “[t]he wholesale realism of this doctrine [of equivalents],” which is “not always applied in favor of the patentee but is sometimes used against him.”⁵⁹ The *Severy* case is refreshing in its avoidance of the technical parsing of claim terms common to contemporary infringement analysis.⁶⁰ Instead, the court confronted a situation where the accused infringer has given to society an improvement far beyond the patent holder’s failed attempts—the accused party had actually solved the problem in the art—regardless of whether the improvement technically fell within the language of the claims. In such a situation, it benefits society to excuse infringement so that the grant of the patent monopoly does not act perversely to impede the greater innovation.

This weighing of practical and commercial success occurs repeatedly in this “lost” reverse doctrine of equivalents precedent. In the 1909 case of *General Electric Co. v. Allis Chalmers Co.*, the District Court for the District of New Jersey found noninfringement under the reverse doctrine of equivalents even though “the defendant’s device may be within the language of the claim,” because “[i]nfringement is not a mere matter of words.”⁶¹ Among the stilts upon which the court rested its holding was the following assessment of commercial success:

The complainant’s patent has never been used to any considerable extent. Only about 50 of them were ever made, and their use was abandoned 8 or 9 years ago. On the contrary, the defendant’s device has provided a successful notch-to-notch movement, and, when used normally and naturally, cannot act otherwise.⁶²

Once again, the court relied on an assessment of the commercial success of the accused product as compared to the commercial failure of the patent holder’s product.

57. *Id.* at 584 (quoting *Boyden Power-Brake*, 170 U.S. at 568).

58. *Id.* at 586.

59. *Graver Tank*, 339 U.S. at 608.

60. *See, e.g.*, *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc) (holding that claim construction should be analyzed primarily in light of the claim language, the specification, and the prosecution history).

61. 171 F. 666, 669 (D.N.J. 1909).

62. *Id.* at 670.

Similarly, in *Wheeling Stamping Co. v. Standard Cap & Molding Co.*, the District Court for the District of Maryland considered the relative innovations that the patent holder and the accused infringer had given to society. The court found noninfringement under the reverse doctrine of equivalents, observing that “the history of the three patents indicates that, assuming they are operable, nevertheless, they are of extremely doubtful commercial utility.”⁶³ The court observed that the patents-in-suit “have proved to be little more than paper patents,”⁶⁴ meaning that the claimed inventions have never been reduced to actual practice. “[O]n the other hand, the defendant’s device, while not patented . . . is now in extensive commercial use.”⁶⁵ In effect, the court declined to reward a plaintiff who had given nothing to society beyond a piece of paper at the expense of a defendant who has brought to the market a successful commercial product.

This emphasis on the value to society of the accused *innovation* over the asserted *invention* rings a chord with commercialization theory, which emphasizes the social utility of the investment and activity required to produce an innovation: the development of a working prototype, market testing and marketing, distribution of the commercial product, product improvements, and other activities “which are fraught with uncertainty and great expense.”⁶⁶ More generally, the reverse doctrine of equivalents serves to protect the consideration society receives in exchange for the patent grant beyond the value of patented inventions—here, a successful improvement.⁶⁷

C. The Reverse Doctrine of Equivalents Was Not a Disfavored Doctrine Prior to the 1982 Creation of the Federal Circuit

The two Supreme Court opinions discussing the reverse doctrine of equivalents contain no language suggesting that it is a disfavored doctrine or rare phenomenon, as the Federal Circuit opinions discussed earlier maintain. In *Boyden*, the Court stated:

We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided. The converse is *equally true*. The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed

63. 60 F. Supp. 533, 537 (D. Md. 1945).

64. *Id.*

65. *Id.* See also *Cadwell*, 13 F.2d at 489 (“Defendant has produced and marketed in quantities the tire of which complaint is made, while so far as I can find from the record, no tires constructed in accordance with the patent in suit have ever been manufactured . . .”).

66. Sichelman, *supra* note 3, at 348–54.

67. This need concerns many other modern patent law theories as well, as discussed below. See *infra* Section III.

the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent.⁶⁸

Fifty-two years later, in *Graver Tank*, the Court spoke in the same tone, giving no indication that the reverse doctrine of equivalents was disfavored or rarely applied: "The wholesale realism of this doctrine is not always applied in favor of a patentee but is *sometimes* used against him."⁶⁹

The court of appeals and district court cases outside of the Federal Circuit similarly treated the reverse doctrine of equivalents as nothing extraordinary. Indeed, there is a body of precedent standing for the proposition that reverse equivalents must *always* be considered prior to finding infringement. In *Mead Digital Systems v. A.B. Dick Co.*, the Sixth Circuit affirmed noninfringement under the reverse doctrine of equivalents and made clear that the question must always be considered:

Infringement should not be determined by a mere decision that the terms of a claim of a valid patent are applicable to the defendant's device. Two things are not necessarily similar in a practical sense because the same words are applicable to each. . . . Put differently, the doctrine of literal infringement is informed by the doctrine of equivalents: in infringement actions *the court must consider* the substance of the invention along with the form of the claims. Thus, even were we to determine that the DIJIT printer "reads on" claims 1 and 33 of the Sweet patent, *we would still be required to consider* whether those claims should be restricted by the doctrine of equivalents.⁷⁰

In *Mead Digital Systems*, the Sixth Circuit did not even consider the plaintiff's arguments that the accused device read literally on the asserted claims, stating, "Since we determine that the DIJIT printer is not the equivalent of the invention disclosed in the Sweet patent, we need not consider whether it is in literal infringement."⁷¹ Other courts, including the Second and Ninth Circuits, also have precedent to the effect that the reverse doctrine of equivalents must always be considered prior to finding infringement.⁷² As the Second Circuit

68. *Boyden Power-Brake*, 170 U.S. at 568 (emphasis added).

69. *Graver Tank*, 339 U.S. at 608 (emphasis added).

70. *Mead Dig. Sys., Inc. v. A.B. Dick Co.*, 723 F.2d 455, 463 (6th Cir. 1983) (emphases added).

71. *Id.* at n.12.

72. See, e.g., *Craftmint Mfg. Co. v. Baker*, 94 F.2d 369, 373 (9th Cir. 1938) ("The fact that the claims of appellees' patent are broad enough to cover the appellant's process and medium paper does not establish infringement. To infringe there must be identity of process or combinations of materials used with those described in the patent or their equivalent.") (citing *Boyden Power Brake Co.*, 170 U.S. at 568); *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921) ("Of the claims quoted, the first will undoubtedly, if read literally, cover defendant's device; but that is not final. It remains to inquire whether the alleged infringement displays 'substantial identity' with the thing invented."); see also *British Acoustic Films, Ltd. v. Electrical Research Prods.*, 29 F. Supp. 531, 535-36 (D. Del. 1939) ("Even if Poulsen's claims 1

poetically put it in 1917, “There is no magic in a name, nor in a claim; that the words preferred by a patentee to define his invention apply literally to another’s device suggests, but does not prove, infringement; there must be a substantial identity, to justify that conclusion of law.”⁷³

In the same vein, patent scholar Charles Pigott, Jr. described a principal in 1966 that is wholly alien to the Federal Circuit era understanding of patent law:

It is *well settled* that merely because the claims in suit taken literally read element by element on the accused device does not establish infringement, nor does it establish a presumption of infringement. The patentee in order to prove infringement has the burden of showing that the accused structure is the equivalent of the particular embodiment of the claimed structure disclosed in the specification and drawings. That is, the patentee, while he may be allowed some range of equivalents, must compare the accused structure with the patented structure as disclosed in the specification and drawings, and he must establish substantial identity of means, operation, and result.⁷⁴

The Federal Circuit has adopted a rule that is quite to the contrary, holding that the reverse doctrine of equivalents must be explicitly raised as an affirmative defense, rather than negated by the patent-holder to prove infringement in the first instance: “One does not make a reverse doctrine of equivalents argument simply by mounting a defense to literal or doctrine of equivalents infringement.”⁷⁵ Instead, “[w]hen a patentee establishes literal infringement, the accused infringer may undertake the burden of going forward to establish the fact of noninfringement under the reverse doctrine of equivalents.”⁷⁶

D. The Reverse Doctrine of Equivalents Was Not Reserved for “Radical Improvements”

One of the reasons the reverse doctrine of equivalents is perceived as rare and anachronistic is because scholars have argued that it is reserved for “radical improvements.”⁷⁷ In the scholarly community, there is a debate over whether application of the doctrine

and 2 could be read upon [the] PS-24 machine infringement would not follow. It must be determined that the device of the defendant is not merely in words but in fact the invention of the patent.” (citing *Boyden Power Brake Co.*, 170 U.S. at 568).

73. *Linde Air Products Co. v. Morse Dry Dock & Repair Co.*, 246 F. 834, 838 (2d Cir. 1917).

74. Pigott, *supra* note 17, at 292 (emphasis added).

75. *Texas Instruments Inc. v. U.S. Int’l Trade Comm’n*, 988 F.2d 1165, 1176 (Fed. Cir. 1993).

76. *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1123–24 (Fed. Cir. 1985).

77. *See, e.g., Merges, supra* note 18, at 93–94 (“[B]ecause the doctrine is still good law, a pioneer always has some risk that a court will excuse a radical improvement from infringement despite the fact that it is clearly covered by the patentee’s claims.”).

requires the accused product to be a “radical improvement” or if a merely “substantial” change in principal of the patented invention suffices to avoid infringement.⁷⁸ The concept of a “radical improvement” is foreign to the early case law on the reverse doctrine of equivalents and is noticeably absent from Supreme Court precedent. Instead, the Court has relied on a “substantial identity” standard.⁷⁹ The doctrine applies “where a device is so far changed in principal from a patented article that it performs the same or a similar function in a *substantially* different way, but nevertheless falls within the literal scope of the claim”⁸⁰ Lower court opinions apply the same “substantial identity” standard.⁸¹ Indeed, the notion of limiting the defense to “radical improvers” appears to have scholarly origins.⁸² The only federal case this author has found mentioning such a limitation comes from the District Court for the District of Massachusetts, which in turn found the phrase in scholarly articles.⁸³

In fact, the defense is simply the doctrine of equivalents used defensively⁸⁴ and should therefore apply the same standard as the doctrine of equivalents—but in reverse. Accordingly, an accused product avoids infringement by reverse equivalents when it is *substantially* changed from the principal of the asserted patent, despite literal infringement.⁸⁵ Such a rule reaps more benefit to society than a “radical improvement” requirement by allowing society to both enjoy the use of substantial, and not just radical,

78. See Maurer, *supra* note 40, at 687–89 (summarizing the debate).

79. *Boyden Power-Brake*, 170 U.S. at 568.

80. *Graver Tank*, 339 U.S. at 608–09 (emphasis added).

81. See, e.g., *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921) (“Of the claims quoted, the first will undoubtedly, if read literally, cover defendant’s device; but that is not final. It remains to inquire whether the alleged infringement displays ‘substantial identity’ with the thing invented.”); see also *Nickerson*, 311 F.2d at 881 (“[W]e have concluded that there is no substantial identity of mode of operation between the Bearfoot side wall and the Nickerson side wall”); *Linde Air Products Co. v. Morse Dry Dock & Repair Co.*, 246 F. 834, 838 (2d Cir. 1917) (“[T]hat the words preferred by a patentee to define his invention apply literally to another’s device suggests, but does not prove, infringement; there must be substantial identity, to justify that conclusion of law.”).

82. See Katherine J. Strandburg, *Patent Fair Use 2.0*, 1 UC IRVINE L. REV. 265, 279, 292 (2011) (noting that academics have relied on this justification since the 1980s).

83. *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 339 F. Supp. 2d 202, 287–89 (D. Mass. 2004) (citing Lemley, *supra* note 18, at 991, 1011, 1067) (“The application of the reverse doctrine is to protect substantial improvers from infringing if they are sufficiently radical.”); *Merges*, *supra* note 18, at 92–94 (noting that the alleged infringer must show a “radical improvement” or “significant contribution”).

84. *Graver Tank*, 339 U.S. at 608 (“The wholesale realism of this doctrine is not always applied in favor of a patentee but is sometimes used against him.”).

85. *Id.* at 608–09.

improvements on patented inventions and extracting such innovations from the patent thicket.

Patent scholar Deepa Varadarajan also takes issue with the notion that the doctrine is reserved for “radical improvers.”⁸⁶ According to Professor Varadarajan, however, this is because “a court’s [reverse doctrine of equivalents] analysis is not an explicit consideration of improvement” at all.⁸⁷ “Rather, in practice, the inquiry is a more formalistic assessment of difference.”⁸⁸ But as discussed above, the early cases indicate that the courts would consider substantial technological and commercial *improvement*, not just difference.⁸⁹

E. The Reverse Doctrine of Equivalents Was Not Redundant of the Enablement and Written Description Requirements

The Federal Circuit is also incorrect that the need for the reverse doctrine of equivalents is obviated by the 1952 Patent Act’s implementation of Section 112.⁹⁰ Generally speaking, the enablement and written description requirements of Section 112 require that the claims be supported by a specification that both enables a person of ordinary skill in the art to practice the claimed invention and demonstrates that the inventor was in possession of the claimed invention.⁹¹ In *Tate Access Floors v. Interface Architectural Resources, Inc.*, the Federal Circuit wrote that these and other requirements imposed by the 1952 passage of Section 112 rendered the judicially created reverse doctrine of equivalents unnecessary.⁹² This was because many of the cases applying the reverse doctrine of equivalents engaged in an analysis that would narrow the claims to match the disclosures of the specification.⁹³ Accordingly, the Federal Circuit

86. See Deepa Varadarajan, *Improvement Doctrines*, 21 GEO. MASON L. REV. 657, 690 (2014).

87. *Id.*

88. *Id.*

89. See *supra* Section II.B.

90. *Tate Access Floors*, 279 F.3d at 1368 (“[W]hen Congress enacted 35 U.S.C. § 112, after the decision in *Graver Tank*, it imposed requirements for the written description, enablement, definiteness, and means-plus-function claims that are co-extensive with the broadest possible reach of the reverse doctrine of equivalents.”).

91. See 35 U.S.C. § 112. See generally *Ariad Pharms. v. Eli Lilly & Co.*, 598 F.3d 1336, 1344 (Fed. Cir. 2010) (en banc) (explaining the enablement and written description requirements of Section 112).

92. *Tate Access Floors*, 279 F.3d at 1368.

93. See, e.g., *Lockwood v. United Bakeries Inc.*, 324 F.2d 82, 88 (9th Cir. 1963) (“Even if a claim can be read in terms upon an accused article, infringement does not necessarily follow unless it can be found as an ultimate fact that the article uses the inventor’s idea as embodied in the inventor’s design and drawings and that there is sameness or equivalence of function and

wrote in *Tate Access* that “when Congress enacted 35 U.S.C. § 112, after the decision in *Graver Tank*, it imposed requirements for the written description, enablement, definiteness, and means-plus-function claims that are co-extensive with the broadest possible reach of the reverse doctrine of equivalents.”⁹⁴

The Federal Circuit’s analysis is flawed for several reasons. First, the enablement and claim definiteness requirements trace their origins to the eighteenth and nineteenth centuries and were merely codified by the 1952 Patent Act.⁹⁵ Hence, these requirements traditionally coexisted with the reverse doctrine of equivalents. Moreover, the reverse doctrine of equivalents is not substantively redundant of the Section 112 requirements. Granted, there have been cases over the years that apply the doctrine in a way that is akin to narrow claim construction, limiting the claims to the specification disclosures.⁹⁶ But the cases largely undertake the different task of comparing the accused device to the patented invention (or even its commercial embodiment) and asking whether the accused device is substantially different.⁹⁷ Accordingly, the reverse doctrine of

means.”); *see also* *Foster Cathead Co. v. Hasha*, 382 F.2d 761, 765, 766 n.5 (5th Cir. 1967) (“Accordingly, no matter how broad the claims may be when taken literally, and even though they may avoid the prior art when given the broadest interpretation, nevertheless the claims can cover only the particular embodiment the patentee has disclosed and equivalents thereof.”); *Foster Wheeler Corp. v. Babcock & Wilcox Co.*, 512 F. Supp. 792, 802 (S.D.N.Y. 1981) (“The present case is a much stronger one for the application of the ‘reverse’ doctrine because all of [the] original claims were limited, and the patent specification was never amended.”).

94. *Tate Access Floors*, 279 F.3d at 1368.

95. *See* ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* 260 (6th ed. 2013) (“An important early case, *Grant v. Raymond*, 31 U.S. 218 (1832), employed the contract metaphor to lay the groundwork for the modern enablement doctrine in the U.S.”); *id.* at 316 (“This principle has deep roots. The Supreme Court, in *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 432–33 (1822), interpreted the disclosure section of the 1793 statute as having two purposes: (1) ‘to make known the manner of constructing the [invention] so as to enable artisans to make and use it,’ and (2) ‘to put the public in possession of what the party claims as his own invention’ so as to prevent the inventor from ‘pretending that his invention is more than what it really is, or different from its ostensible objects.’”).

96. *See, e.g., supra* note 93.

97. *See, e.g., Nickerson*, 311 F.2d at 881 (“[T]here is no infringement by appellants, for the mode of operation of their side wall is different, and there is no equivalency of means.”); *Duncan v. Cincinnati Butchers’ Supply Co.*, 171 F. 656, 665 (6th Cir. 1909) (“The case seems to us an excellent illustration of the rule that when each of the two inventors improve upon the former art, each in his distinct and separate way, they shall each be credited with his own improvement.”); *Standard Computing Scale Co. v. Computing Scale Co.*, 126 F. 639, 649 (6th Cir. 1903) (“If with other means a kind of flexibility between the weighing beam and the computing beam is supplied, it is done by a different mechanism operating in a different way.”); *Technicon Instruments Corp. v. Alpkem Corp.*, 664 F. Supp. 1558, 1575 (D. Or. 1986) (“The RFA-300 is very different in principle from the ‘598 patent. Under the reverse doctrine of equivalents, I find the RFA-300 does not infringe the ‘593 patent.”); *Keystone Plastics, Inc. v. C & P Plastics, Inc.*, 340 F. Supp. 55, 70 (S.D. Fla. 1972) (“While the patent claims may be literally construed to describe the weakened centers of the bristles of Defendants’ mats, the principle of Defendants’ product is

equivalents serves a different function from ensuring that claims are described and enabled in the specification; it preserves to society substantial improvements that are changed in principle from the patented invention.⁹⁸

What this author has described as the “lost precedent” of the reverse doctrine of equivalents is the large body of district court and regional circuit court cases applying the doctrine favorably prior to the creation of the Federal Circuit. One may wonder if this body of case law is truly lost, insofar as it is not binding on the Federal Circuit, which now has exclusive intermediate appellate jurisdiction over patent law cases. However, it must be emphasized again that the Supreme Court has never suggested that the reverse doctrine of equivalents is disfavored or rare. And the Federal Circuit has only made such statements in panel opinions.⁹⁹ The Supreme Court or the *en banc* Federal Circuit could revive and strengthen the doctrine, a

different from and does not embody the spirit or intent of the claimed invention.”); *Wheeling Stamping Co. v. Standard Cap & Molding Co.*, 60 F. Supp. 533, 537 (D. Md. 1945) (reasoning that plaintiff’s patents “have proved to be little more than paper patents; whereas, on the other hand, the defendant’s device, while not patented, not only has features as respects both construction and operation that are distinctly different from any described in the claims or specifications of plaintiff’s patents, but is now in extensive commercial use”); *Meikle v. Timken-Detroit Axle Co.*, 44 F. Supp. 460, 465 (E.D. Mich. 1942) (“While claims 13 and 14 of the reissue patent read in terms on some of the accused structures, the accused structures differ in mode of operation and result from the patent disclosures.”); *Radio Corp. of Am. v. Mackay Radio & Tel. Co.*, 16 F. Supp. 610, 613–14 (E.D.N.Y. 1936) (“[I]t appears that the defendant’s devices, which are alleged to infringe, use a radically different arrangement to accomplish an old result, and irrespective of the validity of the patent in suit or whether or not the claims are readable on defendant’s antennas.”); *T.H. Symington & Son, Inc. v. Symington Co.*, 9 F. Supp. 699, 708 (D. Md. 1935) (“It is apparent on inspection that the defendant’s coil-elliptic arrangement is different in form and appearance from the plaintiff’s device, but more importantly, the principle and result . . . is different”); *Cadwell*, 13 F.2d at 489 (“Defendant has produced and marketed in quantities the tire of which complaint is made, while so far as I can find from the record, no tires constructed in accordance with the patent in suit have ever been manufactured”); *Allis-Chalmers Co.*, 171 F. at 670 (“The defendant has applied a different principle, and uses different means to accomplish the desired result.”); *Severy Process Co.*, 113 F. at 586 (“Each of the devices in controversy has advantages peculiarly its own. There is room enough in the art for both.”).

98. See Nathaniel Durrance, *How the Doctrine of Equivalents May Save Claim Construction*, 33 AIPLA Q.J. 73, 81 (2005) (“As contemplated by the RDOE, however, there may be situations when the requirements of [35 U.S.C.] § 112 are met, such as enablement and written description, but where it may be inequitable to give the patentee the full breadth of the literal claim scope due to a subsequent advancement in technology.”). As discussed in Sirilla et al. *supra* note 41, at 81–82, the Supreme Court has rejected a similar argument that Section 112 of the 1952 Act tacitly eliminated the doctrine of equivalents altogether (and not merely the reverse doctrine of equivalents). See *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 28 (1997) (“[T]he lengthy history of the doctrine of equivalents strongly supports adherence to our refusal in *Graver Tank* to find that the Patent Act conflicts with that doctrine. Congress can legislate the doctrine of equivalents out of existence any time it chooses. The various policy arguments now made by both sides are thus best addressed to Congress, not this Court.”).

99. See *Tate Access Floors*, 279 F.3d at 1368; see also *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008).

development that would be in accord with contemporary patent theory and good public policy.

III. SUPPORT FOR THE REVERSE DOCTRINE OF EQUIVALENTS IN MODERN PATENT LAW THEORIES

It is a tried and true metaphor that the US patent system is a *quid pro quo* between the public and the inventor. In exchange for the inventor disclosing to the public a new invention, the public incurs the competitive harm of granting the inventor a temporary monopoly. In *Brenner v. Manson*, the Supreme Court wrote that “[t]he basic *quid pro quo* . . . for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility.”¹⁰⁰ The Court has invoked this contractual metaphor in deciding numerous other cases.¹⁰¹ The *quid pro quo* metaphor is supported in the language of the Constitution, which provides that Congress may grant patents and copyrights “[t]o promote the Progress of Science and useful Arts.”¹⁰² But the Constitution does not state that patents may be granted solely to promote “inventions”—rather, it is to promote something broader: “the *Progress of Science and useful Arts*.”¹⁰³ The Supreme Court has recognized explicitly that patent laws should foster not only invention, but also innovation—even if only indirectly. Referring to the *quid pro quo* in *Kewanee Oil Co. v. Bicron Corp.*, the Court wrote, “The productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens.”¹⁰⁴ In other words, the return the public should receive in exchange for the patent grant is not only abstract specifications of inventions; the public should also receive commercial products, increased employment, and better lives.

As this author has argued elsewhere, modern patent law theories, although they may disagree on many points, seem to agree that the consideration society receives in exchange for the patent

100. 383 U.S. 519, 534 (1966).

101. See, e.g., *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.*, 534 U.S. 124, 142 (2001) (“The disclosure required by the Patent Act is ‘the *quid pro quo* of the right to exclude.’”) (quoting *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 484 (1974)); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 161 (1989) (referring to “the *quid pro quo* of substantial creative effort required by the federal statute”).

102. U.S. CONST. art. I, § 8, cl. 8.

103. *Id.* (emphasis added).

104. *Kewanee Oil Co.*, 416 U.S. at 480.

grant should not be limited to claimed inventions.¹⁰⁵ Rather, the more valuable types of consideration go beyond the patent claims and consist of such things as: (1) further innovations created in an attempt to design around the patent; (2) further innovations created by losers in the “patent race”; (3) commercialization, product development, and marketing required to turn an invention into an actual innovation; (4) unclaimed scientific information contained in the patent document; and (5) the signals patent portfolios give to investors regarding the economic potential of start-ups and other companies.¹⁰⁶ Because these indirect benefits caused by the patent system are not claimed as inventions, they may be referred to as “unclaimed consideration.”¹⁰⁷

This Part begins by briefly summarizing this commonality among four modern patent law theories: commercialization theory, patent disclosure theory, patent race theory, and signaling theory (also called “portfolio” theory). All four theories place primary value on unclaimed consideration received in exchange for the patent grant, rather than claimed inventions. Accordingly, all of these theories cry for the patent laws to be reformed to make the regime more fertile ground for the development of such “unclaimed consideration.” The Part then transitions to the argument that such patent reform may be right under our noses: it is the reverse doctrine of equivalents.

A. Commercialization Theory

Commercialization theory recognizes the substantial value of the effort, risk, creativity, and expense required to turn an idea or invention into a feasible commercial product.¹⁰⁸ Ted Sichelman writes that bringing a product to market is a “lengthy process,” involving many steps that are “fraught with uncertainty and great expense.”¹⁰⁹ A working prototype must be developed; the product must be tested and improved; for certain products, tests must be conducted to comply with government regulations; the product must be market tested and marketed; and the product must be manufactured, distributed, and advertised.¹¹⁰ This innovation activity is valuable consideration that society should ideally receive in exchange for the patent grant.

105. See Ernst, *supra* note 4, at 11–24.

106. *Id.*

107. *Id.*

108. See Lemley, *supra* note 5, at 711 (“Commercialization theory . . . hypothesizes that we grant patents in order to encourage not invention but product development . . .”).

109. Sichelman, *supra* note 3, at 348–54.

110. See Chris Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 88–89 (2009) (“There is an enormous amount of technical and market information generated as development proceeds towards the final goal of commercial sale. . . . The process, hopefully

However, the patent laws only require the description of an invention, without any requirement to develop a commercial product or even develop a working prototype.¹¹¹ And because the majority of patented inventions are never commercialized,¹¹² they create a “patent thicket” that true innovators must navigate in order to produce a practical, workable innovation for the benefit of the public.¹¹³ Hence, according to commercialization theory, the patent laws should be reformed to encourage the development of innovations, not just inventions.¹¹⁴ As later discussed, a revitalized reverse doctrine of equivalents is an ideal tool for achieving these goals.¹¹⁵

B. Disclosure Theory

Modern disclosure theory similarly values unclaimed consideration received in exchange for the patent grant. According to disclosure theory, an important function of the patent system is to induce the disclosure of useful technical information, including background and other technical information that is not claimed as an invention. As Jeanne Fromer argues, these disclosures are valuable because they can lead to further innovations beyond the patented invention, “[T]he disclosure can stimulate others to design around the invention or conceive of new inventions—either by improving upon the invention or by being inspired by it—even during the patent term.”¹¹⁶ Professor Dan L. Burk argues that unclaimed patent disclosures are

results in a commercialized product that is technologically feasible and best meets market demand.”).

111. Sichelman, *supra* note 3, at 344 (“The upshot is that patent law confers direct encouragement to inventors who create and disclose intangible specifications, but not necessarily tangible products.”).

112. *Id.* at 362–64 (observing that the claims of less than half of all patents are ever commercialized and only about 5 percent of patents are ever licensed for a royalty).

113. Cotropia, *supra* note 110, at 112 (“This underdevelopment of patented inventions . . . can have serious consequences because it can only hamper, as opposed to promote, technological progress.”).

114. See, e.g., William Kingston, *Innovation Needs Patents Reform*, 30 RESEARCH POL’Y 403, 416 (2001) (proposing the creation of an “innovation warrant” to “protect[] innovation directly, instead of indirectly . . .”); Sichelman, *supra* note 3, at 345 (proposing the creation of a “commercialization patent” to be granted in return for “a commitment to commercialize a product not available in the marketplace”); see also Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065, 1109–20 (2007) (proposing auctions to reward to bidders extended patent terms which would encourage the commercialization of the patented inventions); Michael Abramowicz & John Duffy, *Intellectual Property for Market Experimentation*, 83 N.Y.U. L. REV. 337, 401–02 (2008) (proposing restrictions on the claim scope, status as prior art, and higher validity bars for uncommercialized patents); Cotropia, *supra* note 110 at 119–20 (proposing that patentees must reduce their inventions to practice prior to patenting).

115. See *infra* Section III.E.

116. Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 548–49 (2009).

useful for recording and codifying industrial knowledge that would not otherwise be published.¹¹⁷ These unclaimed patent disclosures spur further innovations by allowing new companies to learn essential industrial knowledge.

Critics of disclosure theory maintain that researchers do not read patents in conducting their research.¹¹⁸ But Professor Lisa Larrimore Ouellette has conducted research to refute this supposition. Her survey of nanotechnologists revealed that some 64 percent of respondents consulted patents in conducting their research.¹¹⁹ Moreover, it is not the patented inventions that researchers primarily find useful in reading patents; instead, it is background information and technical details that help inform their own research.¹²⁰ Indeed, the patent claims are the least useful portion of the patent to researchers, because “the majority of them believe that patents do not enable a skilled researcher to reproduce the invention.”¹²¹

Accordingly, disclosure theory posits that the patent disclosure provides valuable consideration to society in exchange for the patent grant beyond the value of the claimed inventions. This is not only so that the public can make the patented inventions after the expiration of the patent; disclosure, more importantly, inspires further innovations and market entries unrelated to the claimed inventions. Disclosure theorists argue that patent disclosure requirements should be reformed to more usefully perform this function.¹²² As later discussed, safeguarding the unclaimed consideration that patent disclosure theory values can be achieved through a revitalized reverse doctrine of equivalents.¹²³

C. Patent Race Theory

Patent race theory is premised on the fact that most successful innovations are developed as the result of many different researchers

117. Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1011, 1027, 1032 (2008).

118. See, e.g., Alan Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. & TECH. 401, 405 (2010); Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 148 (2006).

119. Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HARV. J.L. & TECH. 531, 534 (2012).

120. *Id.*

121. *Id.* at 564.

122. See, e.g. Fromer, *supra* note 116, at 593–96.

123. See *infra* Section III.E.

competing to solve the same problem.¹²⁴ Accordingly, patent races (or more accurately, “innovation races”) do not result in wasteful, duplicative efforts, as maintained by prospect theory.¹²⁵ Rather, innovation races are necessary to the creation of successful inventions.¹²⁶ More importantly, however, is the valuable unclaimed consideration that society receives as the result of patent races. The “losers” in a patent race often develop other innovations, different from the “winner’s” patented invention.¹²⁷ In addition, patent races inspire researchers to work faster, which results in more rapid innovation and the earlier expiration of patents.¹²⁸ Indeed, Professor Jean Tirole argues that “[i]t would thus be desirable to formalize successive patent races.”¹²⁹ In other words, patent races are so socially beneficial that Professor Tirole contends they should be formalized in the law. Patent races have social utility because they inspire the creation of “unclaimed consideration” beyond the value of claimed inventions. The reverse doctrine of equivalents can guard such unclaimed consideration.¹³⁰

D. Patent Signaling Theory

Patent signaling theory is grounded in practical realism: companies seek patents primarily because of the signals they give to potential investors, not in order to preserve the exclusive right to make the patented inventions.¹³¹ Patents are a credible way for a company to convey information about itself because they bear the stamp of approval of a government agency—the US Patent and Trademark Office (USPTO)—and are submitted under a duty of candor to USPTO.¹³² Patents are an efficient way to convey

124. See Lemley, *supra* note 5, at 712–33 (demonstrating that “[t]he overwhelming majority of inventions, including the overwhelming majority of so-called ‘pioneering’ inventions, are in fact developed by individuals or groups working independently at roughly the same time”).

125. See, e.g., Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 271 (1977) (“Subsequent investigation of the same prospect by other firms can neither build on the knowledge obtained by the first searcher nor determine the efficient level and strategy of search based upon his failure.”).

126. Lemley, *supra* note 5, at 712–33.

127. See JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 400 (“The loser of a patent race does not always lose everything; sometimes it comes up with a patent for another product (or else with more experience for the patent race).”).

128. Lemley, *supra* note 5, at 753.

129. TIROLE, *supra* note 127.

130. See *infra* Section III.E.

131. See Holbrook, *supra* note 118, at 131–36 (2006).

132. Clarissa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 649 (2002). The US Patent and Trademark Office (USPTO) regulations provide, in pertinent part, “Each individual associated with the filing and prosecution of a patent application has a duty of candor and good

information to investors because it costs less for companies to convey information about themselves in government-certified documents than it would cost for investors to painstakingly gather the information themselves.¹³³

But the bulk of particularly useful information that patents convey to investors has little to do with the claimed inventions. Indeed, it would be highly inefficient for investors to attempt to understand and assess the potential value of each of the claimed inventions in a large patent portfolio.¹³⁴ Rather, a high number of patents indicate first to investors that the company has resources to invest in research, development, and patent prosecution.¹³⁵ Second, patents indicate generally the areas of research in which the company is engaged and the prior art research of other companies that the investment target pays attention to.¹³⁶ Finally, one might add that even established companies often obtain patent portfolios primarily because of their signals—to warn competitors not to sue for patent infringement, lest they take the risk of being countersued.¹³⁷

Fundamentally, patent signaling theory, like the other theories discussed earlier, recognizes that the primary value patents provide to society is not the ultimate ability to practice claimed inventions at the end of the patent term, but unclaimed consideration—here, an efficient and credible system of conveying information to investors about investment targets. The reverse doctrine of equivalents can advance the goal of patent signaling theory to ensure that the patent system guards this unclaimed consideration without creating a burden on innovation.¹³⁸

faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section.” 37 C.F.R. § 1.56 (2016).

133. Long, *supra* note 132, at 644.

134. See Holbrook, *supra* note 118, at 138 (“The disclosure of any single patent is likely irrelevant in market signaling theory because evaluating the contents of the patent for accuracy would greatly increase costs, undermining the efficiency gains of the signal.”).

135. Long, *supra* note 132, at 647.

136. *Id.*

137. See, e.g., James Niccolai, *Are Motorola's Patents Enough to Protect Android?*, P.C. WORLD (Aug. 15, 2011), http://www.pcworld.com/article/238129/are_motorolas_patents_enough_to_protect_android.html [<https://perma.cc/88DT-RV53>] (speculating that Google purchased Motorola's \$1.25 billion patent portfolio because it “should help shield Google and its partners from future legal action . . .”).

138. See *infra* Section III.E.

E. The Patent Reform Under Our Noses: The Reverse Doctrine of Equivalents

In short, there is a growing theoretical consensus that the patent laws should foster “Progress” broadly defined as something beyond the value of claimed inventions: actual innovations for the benefit of the public, which spring from commercialization efforts; unclaimed technical disclosures that facilitate new market entries and further innovations; patent races that lead to innovations other than the “winners” claimed inventions; attempts to design around patents, which lead to further innovations; credible and efficient signals that patent portfolios give to investors; and a host of other activities wholly unrelated to the actual claimed inventions.¹³⁹

But the facts on the ground reveal that the patent system often acts perversely to impede the flowering of this unclaimed consideration. Litigation imposes a tremendous tax on commercial innovations,¹⁴⁰ particularly when the asserted patents have not themselves been commercialized—as is true for the majority of patents.¹⁴¹ Although commercialization theory thus recognizes that realized innovations are more valuable to society than abstract invention specifications, the patent system foolishly allows uncommercialized patents to impose a heavy tax on such innovations. Although patent disclosure theory recognizes that researchers find the background information about industries and technology in patents more valuable than the claimed inventions, the patent systems allows the claimed inventions to squelch the new market entries and innovations that would otherwise be made possible by these patent disclosures.¹⁴² Although patent race theory recognizes that the innovations developed by “losers” in the patent race are often more valuable than the “winners” claimed inventions, the patent system allows those claimed inventions to impede and tax the innovations developed by the patent race losers.¹⁴³ Although the information about investment targets that patent counts give to investors is more valuable than any particular claimed inventions therein, the patent

139. See *supra* Sections III.A–D.

140. See Bessen & Maurer, *supra* note 9, at 408 (noting that non-practicing patent assertion entities imposed litigation costs on defendants of \$29 billion in 2011).

141. Sichelman, *supra* note 3, at 362–64.

142. See *supra* Section I.A.

143. See *id.* A patent gives the inventor the right to exclude any innovation that falls within the claims of the patent, even if it improves upon the patented invention. See CRAIG ALLEN NARD, *THE LAW OF PATENTS* 457 (2d ed. 2011). Accordingly, absent the reverse doctrine of equivalents, the patent law can allow an innovation developed by a patent race loser to be ensnared by a patent even if it substantially improves upon the patented invention.

system allows the uncommercialized claimed inventions of patent trolls to raise the risk for investors and to impede those very start-up companies.¹⁴⁴

But while patent reforms wallow in Congress, there is a patent reform to address the problem readily at hand: the reverse doctrine of equivalents. The reverse doctrine of equivalents is an ideal vehicle for protecting true innovations from the thicket of patent claims because of its “wholesale realism.”¹⁴⁵ When confronted, for example, with a non-practicing entity that can semantically ensnare a true innovation within the literal words of its patent claim, the court may consider whether infringement is avoided by the reverse doctrine of equivalents.

Application of the reverse doctrine of equivalents requires, of course, a determination of whether the accused product is so substantially different from the patented invention as to change the principal of the invention, despite the ability to demonstrate literal (or semantic) infringement.¹⁴⁶ But as is revealed in the “lost precedent” of the reverse doctrine of equivalents, the court may also consider the question “from a practical and commercial point of view.”¹⁴⁷ In the *Boyden* case itself, the court decided to favor the accused device because it solved the problem in the art, whereas the patent holder’s product “did not prove to be a success”¹⁴⁸

In the circumstance where the patent holder makes no commercial product at all, as in the case of a patent troll, the case for applying the reverse doctrine of equivalents is even stronger. Like the District of New Jersey’s decision in *General Electric v. Allis-Chalmers Co.*, the court may consider that “[t]he complainant’s patent has never been used to any considerable extent”; whereas “[o]n the contrary, the defendant’s device has provided a successful notch-to-notch movement”¹⁴⁹ In other words, the court, when determining noninfringement, takes into account that the defendant has not

144. Robin Feldman, Tom Ewing, & Sara Jeruss, *The AIA 500 Expanded: The Effects of Patent Monetization Entities*, 17 UCLA J.L. & TECH. 1, 13 (2013) (observing that non-practicing entities filed 58.7 percent of the patent infringement lawsuits in 2012 and frequently target startup companies in the Internet and technology sectors).

145. *Graver Tank*, 339 U.S. at 608.

146. *Id.* at 608–09; see also *Allis-Chalmers Co.*, 171 F. at 669 (“Infringement is not a mere matter of words.”).

147. *Severy Process Co.*, 113 F. at 583; see *supra* Section II.B.

148. *Boyden Power-Brake*, 170 U.S. at 572.

149. *Allis-Chalmers Co.*, 171 F. at 670; see also *Cadwell*, 13 F.2d at 489 (“Defendant has produced and marketed in quantities the tire of which complaint is made, while so far as I can find from the record, no tires constructed in accordance with the patent in suit have ever been manufactured”).

practiced its patent to any great success—thus not providing society with a useful innovation.

In this way, an invigorated reverse doctrine of equivalents could help to assure that the patent system promotes “the Progress of Science and useful Arts,”¹⁵⁰ not merely abstract inventions. This enhancement would be achieved on a case-by-case basis, with the court taking into consideration the relative equities of the parties. Such a solution would address the problem of patent trolls but would also temper the fear of opponents of legislative patent reform that broad prospective legislation could have an unforeseen harmful impact on innovation generally.¹⁵¹ It is not possible to predict with certainty whether a revitalized reverse doctrine of equivalents would have a negative impact on the incentive to invent or to quantify any such impact the doctrine might have. But a judge-made doctrine applied on a case-by-case basis that weighs the relative value of each individual litigant’s contribution to society is a far more cautious way to proceed than broad prospective patent reform litigation. There is no evidence that the reverse doctrine of equivalents discouraged innovation between 1898 and 1988, the years when it was in active use. These years saw the development of revolutionary innovations, from the airplane¹⁵² to the incandescent light bulb¹⁵³ to the Internet. The regular use of the reverse doctrine of equivalents does not appear to have squelched these innovations.

IV. REFORMING AND REFINING THE REVERSE DOCTRINE OF EQUIVALENTS

Hence, the reverse doctrine of equivalents should be invigorated to serve as a tool to protect the valuable unclaimed consideration society receives in exchange for the patent grant from the thicket of uncommercialized patented inventions. This Part

150. U.S. CONST., art I, § 8, cl. 8.

151. See, e.g., Press Release, Biotech. Indus. Org., BIO Opposes H.R. 9, the Innovation Act (June 11, 2015) (“BIO consistently has urged Congress to proceed cautiously when addressing any changes to the patent system that could unduly shift the legal balance against legitimate patent owners.”), <https://www.bio.org/media/press-release/bio-opposes-hr-9-innovation-act> [<https://perma.cc/57GF-FBGG>]; Press Release, Higher Educ. Ass’n, Statement on Scheduled House Judiciary Committee Markup of Innovation Act (H.R.9) (June 10, 2015) (“H.R. 9 is not targeted to address the small minority of patent holders that are abusing the system. Rather the bill would weaken the entire patent system.”), <http://www.aplu.org/news-and-media/News/higher-education-association-statement-on-scheduled-house-judiciary-committee-markup-of-innovation-act-hr-9> [<https://perma.cc/9FHY-4YCT>].

152. See *Flying Mach.*, U.S. Patent No. 821,393 (filed Mar. 23, 1903) (issued May 22, 1906).

153. See Lemley, *supra* note 5, at 722–23 (discussing Thomas Edison’s development of the incandescent light in the early 1900s).

explores how the doctrine might be reformed to make it more acceptable to the courts.

A. The Reverse Doctrine of Equivalents Should Apply to Substantial Improvements, Not Just Radical Improvements

Other scholars agree that the reverse doctrine of equivalents should play a more important role in the patent regime than it does under current law. Professor Robert Merges argues that the doctrine could break the bargaining deadlock between holders of pioneer patents and parties who develop key improvements on the patented technology.¹⁵⁴ Bargaining deadlock occurs when the holder of an earlier patent and an innovator of an improvement on that patent fail to agree to a cross-license, thereby depriving society of the improvement to the patented invention.¹⁵⁵ Under such circumstances, the reverse doctrine of equivalents would ideally “serve[] as a judicial ‘safety valve,’ releasing pressure that builds up when pioneers and improvers fail to agree to a license.”¹⁵⁶ Without the pressure that a credible reverse doctrine of equivalents would put on the pioneer patent holder to grant a license, “[t]here is a possibility in these cases that the wonderfully effective improvement developed by the improver will be kept off the market until the pioneer’s patent expires.”¹⁵⁷ But if Professor Merges is correct that the doctrine can serve society by protecting radical improvements against pioneer patents, then that is all the more reason why it should also protect such improvements against the more mundane, uncommercialized patents held by patent trolls.

Mark Lemley has observed that there are three different classes of infringers who improve on patented inventions: minor improvers, significant improvers, and radical improvers.¹⁵⁸ Under the current patent regime, parties who make only minor improvements to a patented invention do not escape infringement.¹⁵⁹ They either literally infringe the patent because they merely add minor features to the claimed invention or they are ensnared by the doctrine of equivalents because their improvements are insubstantial. This is the correct result, because, as the Supreme Court recognized in *Graver Tank*, to arrive at a different outcome would be “to convert the

154. Merges, *supra* note 18, at 75.

155. *Id.*

156. *Id.*

157. *Id.* at 90.

158. Lemley, *supra* note 18, at 1007–13.

159. *Id.* at 1007–08.

protection of the patent grant into a hollow and useless thing.”¹⁶⁰ Significant improvers may also infringe the patent, but they may be able to separately patent their improvement, in which case they may be able to leverage a cross-license with the patent holder so that the patent holder may also incorporate the improvement—the phenomenon of “blocking patents.”¹⁶¹ Radical improvers, on the other hand, may be able to escape liability altogether under the reverse doctrine of equivalents.¹⁶² “The reverse doctrine of equivalents therefore benefits radical improvers at the expense of the original patentee, and so encourages radical improvements, just as the blocking patents rule provides some lesser encouragement to significant improvements.”¹⁶³

But there is no cause to limit the doctrine to “radical improvements.” As discussed earlier, nothing in *Boyd*, *Graver Tank*, or any of the “lost precedent” in between those cases and the death of the doctrine suggest that it is limited to “radical improvers.”¹⁶⁴ Rather, the pre-Federal Circuit precedent excuses infringement for products that are “substantially” changed in principle—seemingly Professor Lemley’s second, intermediate category.¹⁶⁵ This makes sense because the reverse doctrine of equivalents is nothing more than the doctrine of equivalents operating in favor of the accused infringer instead of the patent holder.¹⁶⁶ The doctrine of equivalents tests whether the accused product is “substantially” the same as the patented product despite literal infringement.¹⁶⁷ Hence, the reverse doctrine of equivalents should test whether the accused product is “substantially” different from the patented product despite literal infringement. There is no reason to make the doctrine of equivalents liberal and commonplace when it is applied to benefit patent holders, but extreme, arcane, and extraordinary when applied to benefit accused infringers.

160. *Graver Tank*, 339 U.S. at 606.

161. Lemley, *supra* note 18, at 1009–10.

162. *Id.* at 1012.

163. *Id.* at 1012–13. Unfortunately, even in the case of radical improvements, the reverse doctrine of equivalents is, under current Federal Circuit law, a dead letter. *Id.* at 1657 (“The doctrine is rarely applied, and a recent Federal Circuit decision casts doubt on its future.”) (citing *Tate Access Floors*, 279 F.3d at 1368).

164. See *supra* Section II.D.

165. See *id.*

166. *Graver Tank*, 339 U.S. at 608 (“The doctrine operates not only in favor of the patentee of a pioneer or primary invention, but also for the patentee of a secondary invention consisting of a combination of old ingredients which produce new and useful results.”).

167. *Id.* (“[A] patentee may invoke this doctrine to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result.’”) (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)).

This distinction is not merely a matter of semantics or symmetry. If modern patent theory demonstrates that the more valuable consideration society receives in return for the patent grant are improvements, design-arounds, and other unclaimed consideration,¹⁶⁸ then the patent system should allow for society to receive the benefit of these substantial improvements, not merely radical improvements. The patent system should not lock this powerful weapon away only to be brought out in the case of radical improvements.

Moreover, the phenomenon of blocking patents provides small comfort to innovators who produce substantial improvements. The blocking patents doctrine is a phenomenon resulting from the fact that a party that literally practices each of the limitations of a claimed invention generally does not avoid infringement by adding additional features.¹⁶⁹ The infringing improvement may be sufficiently novel and non-obvious that it qualifies for a patent in its own right.¹⁷⁰ The owner of the improvement patent is still unable to practice her improvement because it will still infringe the first patent, even though it adds additional features.¹⁷¹ But the owner of the first patent is also prevented from practicing the second, improvement patent.¹⁷² The patents block each other and unless the parties agree to a cross-license, the public will be deprived of the benefit of the improvement patent. As Professor Merges has observed, the two parties unfortunately are often locked in bargaining breakdown, unable to arrive at an agreement.¹⁷³ Professor Merges argues that if the improvement patent is a “radical improvement,” then the reverse doctrine of equivalents should excuse infringement and thereby break the bargaining breakdown to the benefit of society.¹⁷⁴

But why should the reverse doctrine of equivalents only relieve “radical” improvers of infringement liability under these circumstances? Why should the doctrine not relieve “substantial” improvers as well? After all, substantial improvers are just as likely (indeed, far more likely) to find themselves locked in the bargaining breakdown Professor Merges refers to than are radical improvers; one would assume the patent holder would be far more eager to license a patented radical improvement than a substantial improvement. More

168. See *supra* Sections III.A–D.

169. NARD, *supra* note 143, at 457 (“Literal infringement cannot be avoided if the accused device contains additional elements not found in the claim.”).

170. JANICE M. MUELLER, *PATENT LAW* 18 (4th ed. 2013).

171. *Id.* at 19.

172. *Id.*

173. Merges, *supra* note 18, at 75.

174. *Id.* at 79.

importantly, non-practicing entities are wholly immune from the blocking patents doctrine, because they produce no product and are therefore unmoved by any pressure to license the improvement patent. Particularly in the case of patent trolls, the reverse doctrine of equivalents thus should adhere to the benefit of substantial improvers, not just radical improvers.

B. The Reverse Doctrine of Equivalents Should Excuse Equivalent Infringement as well as Literal Infringement

For that matter, there is no rationale why the reverse doctrine of equivalents should excuse infringement only for products that fall within the literal scope of the claims. Under current Federal Circuit precedent, “[t]he reverse doctrine of equivalents comes into consideration only when literal infringement is apparent. [If the asserted patent] claims are not literally infringed, the reverse doctrine of equivalents does not apply.”¹⁷⁵ But why should a doctrine that is critical to protecting substantial improvements favor accused products that fall within the literal scope of the claims more than those that only infringe by equivalents? For example, if the asserted patent claim contains limitations A, B, and C, the accused product may escape infringement under the reverse doctrine of equivalents if it meets all three limitations literally but adds a radical improvement. Yet, if the same radical improvement meets only limitations A and B of the asserted patent, substituting an equivalent structure for limitation C, it is not eligible for the protection of the reverse doctrine of equivalents because there is no literal infringement, even if it too contains the radical improvement.¹⁷⁶ Such a regime gives more protection to literal infringers than it does to equivalent infringers and makes no sense in logic or in policy. This is particularly true if the patent holder does not practice its patent and the equivalently infringing improvement represents the solution that allows for a commercially practical invention. In such cases, the court should be able to use the reverse doctrine of equivalents to excuse infringement and allow for society to receive the accused innovation free of the tax imposed by the paper patent.

175. *Texas Instruments, Inc. v. U.S. Int’l Trade Comm’n*, 846 F.2d 1369, 1372 (Fed. Cir. 1988).

176. Nor would the radical improvement necessarily evade infringement under the doctrine of equivalents because the Federal Circuit has recently held that even a separately patentable invention that the USPTO judged to be non-obvious over the asserted patent may not escape infringement under the doctrine of equivalents. *Siemens Medical Solutions v. Saint-Gobain Ceramics & Plastics*, 637 F.3d 1269, 1280–81 (Fed. Cir. 2011), *reh’g en banc denied*, 647 F.3d 1373 (Fed. Cir. 2011), *cert. denied*, 132 S.Ct. 2679 (May 29, 2012).

C. The Test for the Reverse Doctrine of Equivalents Should Be Formalized and Reformed

If the reverse doctrine of equivalents is the patent reform we are seeking to protect innovation from abstract inventions, why has it landed in the dustbin of legal doctrines? Why does the Federal Circuit disfavor a doctrine that not only enjoyed a long pedigree in the case law prior to that court's creation, but also has earned the admiration of prominent scholars?

Professors Burk and Lemley suggest that the Federal Circuit has “effectively rejected the reverse doctrine of equivalents” out of “a resistance to the use of policy levers.”¹⁷⁷ A “policy lever” is a “flexible legal standard” that gives courts the freedom to “adapt the patent statute to evolving technologies.”¹⁷⁸ The reverse doctrine of equivalents is certainly a policy lever, whether it is viewed as a tool to protect “unclaimed consideration,” as described in this Article; a tool to prevent bargaining breakdown, as Professor Merges suggests;¹⁷⁹ or a tool to encourage radical improvers, as Professor Lemley observes.¹⁸⁰ The Federal Circuit does not prefer policy measures, according to Professors Burk, Lemley, and other scholars; they instead favor “simple rules and legal formalism.”¹⁸¹ An illuminating example of the Federal Circuit's attraction to defined legal standards was the court's adoption of the “machine or transformation test” as the exclusive test to determine the patent eligibility of abstract ideas. This standard was rejected by the Supreme Court as the exclusive test and replaced with no definite standard at all.¹⁸² Another example of Federal Circuit formalism was the requirement that accused infringers identify a teaching, suggestion, or motivation to combine prior art references in order to prove that a patented invention would have been obvious.¹⁸³ The Supreme Court rejected this rule on the basis that “a court errs where, as here, it transforms general principle into a rigid rule limiting the obviousness inquiry.”¹⁸⁴

177. Burk & Lemley, *supra* note 35, at 1672.

178. *Id.* at 1579.

179. *See* Merges, *supra* note 18, at 75.

180. *See* Lemley, *supra* note 18, at 1012–13.

181. Burk & Lemley, *supra* note 35, at 1673 (citing Thomas, *supra* note 35).

182. *See* *Bilski v. Kappos*, 561 U.S. 593, 604 (2010) (“The machine-or-transformation test is not the sole test for deciding whether an invention is a patent-eligible ‘process.’”); Timothy B. Dyk & Samuel F. Ernst, *Patents*, in *BUSINESS AND COMMERCIAL LITIGATION IN FEDERAL COURTS* § 86:42 (Robert L. Haig ed., 3d ed. 2011) (“In its stead, the Supreme Court offered no real substitute test beyond pointing to the definition of that term provided in [35 U.S.C.] § 100(b) and looking to the guideposts in [the Court's prior precedent].”) (quoting *Bilski*, 561 U.S. at 612).

183. *See* *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 402 (2007).

184. *Id.*

It is natural for the Federal Circuit to prefer formal and predictable rules to discretionary policy levers. As Judge Meyer has written, "This court was created for the purpose of bringing consistency to the patent field."¹⁸⁵ But this Article does not debate here whether discretionary policy levers are preferable to legal formalism.¹⁸⁶ Instead, this Article's practical task is to salvage the reverse doctrine of equivalents so that it can serve to protect unclaimed consideration. If providing the doctrine with a more certain legal test will make it more attractive to judges, then that is what must be done. In other words, it is possible to formulate a well-defined legal standard that also implements policy.

Importantly, the doctrine of equivalents itself implements policy. The Supreme Court states that the doctrine of equivalents was developed because the courts did not want "to convert the protection of the patent grant into a hollow and useless thing"; the courts do not want to "deprive [the inventor] of the benefit of his invention and . . . foster concealment rather than disclosure of inventions, which is one of the primary purposes of the patent system."¹⁸⁷ Those are specific, articulable policies. A rule to encourage radical improvements is no less a policy than is a rule to encourage the disclosure of inventions—both are policies to "promote Progress," only in different ways.¹⁸⁸ And despite the original policy impetus of the doctrine of equivalents, the Federal Circuit has never been shy about applying that doctrine to establish infringement, using the legal standard of the tripartite test. The tripartite test provides that an accused product infringes by equivalents if it performs substantially the same function in substantially the same way to achieve substantially the same result.¹⁸⁹

As currently formulated, the test for the reverse doctrine of equivalents does not pass muster as a bright line rule. The court is tasked with determining if the accused device "is *so far changed in principal* from a patented article that it performs the same or a similar function in a substantially different way."¹⁹⁰ As Stephen M.

185. *AWH Corp.*, 415 F.3d at 1330 (en banc) (Meyer, C.J., dissenting) (citing H.R. REP. NO. 97-312, at 20–23 (1981)).

186. See Burk & Lemley, *supra* note 35, at n. 377, to read about this debate; Burk & Lemley note that R. Polk Wagner "defends the Federal Circuit's shift to formal rules on the grounds that they provide greater certainty" and argue that they "do not agree with Wagner that the certainty that will be gained by eliminating policy levers is worth the cost to innovation that poorly tailored incentives provide." See also R. Polk Wagner, *Reconsidering Estoppel: Patent Administration and the Failure of Festo*, 151 U. PA. L. REV. 159, 234–37 (2002).

187. *Graver Tank*, 339 U.S. at 607.

188. U.S. CONST. art. I, § 8, cl. 8.

189. *Graver Tank*, 339 U.S. at 608.

190. *Id.*

Maurer points out, “Left unsaid was how much change would be required to trigger the test.”¹⁹¹ Even more troubling is the mysterious concept of the “principal” of the invention; how is one to cope with that metaphysical concept? The Federal Circuit teaches that “[t]he ‘principal’ or ‘equitable scope of the claims’ of the patented invention is determined in light of the specification, prosecution history, and the prior art.”¹⁹² But how is that analysis different from ordinary claim construction, under which courts interpret the actual (and not “equitable”) scope of the claims in light of that same intrinsic evidence?¹⁹³ More importantly, once the reverse doctrine of equivalents is reduced to limiting the equitable scope of the claims in light of the specification, then it really does become redundant of the Section 112 analysis.¹⁹⁴ This is troubling because it leads down the rabbit-hole of *Mead*, in which the court concluded that “when Congress enacted 35 U.S.C. § 112, after the decision in *Graver Tank*, it imposed requirements for the written description, enablement, definiteness, and means-plus-function claims that are co-extensive with the broadest possible reach of the reverse doctrine of equivalents.”¹⁹⁵ If the reverse doctrine of equivalents does nothing more than limit the claims in light of the specification, then it may very well be obviated by Section 112. But, as argued earlier, the lost precedent of the reverse doctrine of equivalents largely does not engage in this type of Section 112 analysis. Rather than measuring the claims of the patent against the principle of the invention as set forth in the specification, the lost precedent weighs the relative technological and commercial merits of the patented invention and the substantially improved commercial product.¹⁹⁶

A test is therefore required that better implements the policy goal of protecting valuable innovations from the snares of uncommercialized patent claims in concrete, well-defined steps:

1. As a first step, the court should compare the *claims* (and not the “principle”) of the patent to the accused product. Despite literal (or even equivalent) infringement, does the accused product add something to the patent claims or modify the claims such that it constitutes a substantial technological improvement on the claimed invention? This is different from ordinary infringement analysis

191. Maurer, *supra* note 40, at 687.

192. *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008) (citing *Scripps Clinic & Research Found. v. Genentech, Inc.* 927 F.2d 1565, 1581 (Fed. Cir. 1991)).

193. *AWH Corp.*, 415 F.3d at 1314–17 (referencing that the court should construe the claims in light of the claim language, the specification, and the prosecution history).

194. *See supra* Section II.E.

195. *Tate Access Floors*, 279 F.3d at 1368.

196. *See supra* Section II.B.

because the court can take account of the additional features the accused product adds to the claims of the patented invention and assess whether they represent a substantial technological improvement. Nor is this exercise redundant of a Section 112 analysis, because the court is not asking whether the claims of the asserted patent are enabled or supported by a written description. Rather, the court is asking whether the accused product adds something to the fully enabled patent claims that represents a substantial technological improvement on those claims.

2. If the court concludes that the accused product is a substantial technological improvement on the patented invention, the court should proceed to weighing the accused product's commercial success. In step 2, the court should compare the accused product to any embodiment of the patented invention (made by a licensee or the patent-holder itself). Does the accused product enjoy substantially superior commercial success as compared to the patent holder's product?

3. A third step should be introduced to ameliorate the concern that the doctrine would unfairly advantage large companies with more resources to successfully commercialize a product over smaller inventors. Hence, the court should require that the accused infringer prove that there is a *nexus* between the superior commercial success and the technological superiority of the accused product. In other words, the accused infringer must demonstrate that the commercial success is not due to marketing, advertising, brand recognition, or other factors unrelated to the technological superiority of the accused product. Such proof is not foreign to patent law. In demonstrating commercial success as a secondary consideration in support of non-obviousness, the patent holder must prove the same nexus between commercial success and the technological merit of the patented invention.¹⁹⁷

If all three elements are proven, then there is a situation where a technologically and commercially superior substantial improvement on the patented invention is in danger of being ensnared by patent claims that are significantly less valuable to society. In such a case, the reverse doctrine of equivalents can be used to preserve to society the more valuable consideration received in exchange for the patent grant and promote "Progress," rather than mere invention.

Nor is this test invented out of whole cloth. It is firmly grounded in the pre-*Graver Tank* precedent. Hence, the Court in

197. *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1311–12 (Fed. Cir. 2006) ("Evidence of commercial success, or other secondary considerations, is only significant if there is a nexus between the claimed invention and the commercial success.").

Boyden compared the accused train brakes to the claimed invention and found a substantial difference.¹⁹⁸ The accused product was substantially technologically superior because “it solved at once, in the simplest manner, the problem of quick action.”¹⁹⁹ The Court then compared the accused product to Westinghouse’s embodiment of its patent and concluded that it was not only technologically superior, but also commercially more successful than the Westinghouse product. Whereas the patent holder’s product did “not seem to have been entirely successful in its practical operation,” and whereas a better solution “was sought after by inventors and car builders,” only the defendant “discovered that it could be done by this mode of operation.”²⁰⁰ Accordingly, the Court was “induced to look with more favor upon [the accused] device.”²⁰¹ As discussed earlier, the other decisions in the “lost precedent” similarly take into account substantial technological improvement and superior commercial success.²⁰²

Hence, by returning the reverse doctrine of equivalents to its pre-*Graver Tank* origins, society could recover an invaluable tool for protecting true innovation from mere invention. And the legal system could do so carefully, and on a case-by-case basis, without unwittingly disturbing the innovation ecosystem. That is the common-law patent reform that lays ready at hand as the reverse doctrine of equivalents.

V. CONCLUSION

Proponents of patent reform legislation argue that the current patent system acts perversely to hinder true innovation in the name of abstract specifications of inventions, which are never commercialized. Opponents of such legislation argue that comprehensive, prospective legislation could have unforeseen harmful consequences that could, in fact, cripple innovation. Perhaps the solution lies not in legislation, but in a common law doctrine lying right under our noses—the reverse doctrine of equivalents. Properly applied, the reverse doctrine of equivalents can serve to protect true innovation from patent thickets by excusing infringement when the defendant’s product is substantially superior to the plaintiff’s embodiment of the patented invention, both technologically and commercially. In order to avoid giving an unfair advantage to large companies, the accused infringer

198. *Boyden Power-Brake*, 170 U.S. at 570.

199. *Id.* at 572.

200. *Id.* at 552.

201. *Id.* at 572.

202. *See supra* Section II.B.

should be required to demonstrate that there is a nexus between the accused product's superior commercial success and its superior technological merit. Such a test need not be created out of whole cloth; it can be found in the pre-Federal Circuit precedent applying the doctrine of *Boyd v. Westinghouse*: the lost precedent of the reverse doctrine of equivalents.