

**THE SUPREME COURT CASE THAT THE FEDERAL
CIRCUIT OVERRULED: *WESTINGHOUSE V. BOYDEN
POWER BRAKE CO.***

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“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. . . .”¹

INTRODUCTION

Can a federal court of appeals overrule Supreme Court precedent? Not overtly. But if nobody takes notice, a circuit court can undermine Supreme Court precedent, vacating lower court decisions that rely on the precedent and announcing in published opinions that a once robust doctrine has somehow suddenly become archaic, disfavored, and rarely applied. This is how the Court of Appeals for the Federal Circuit has caused an important Supreme Court patent law doctrine to vanish: the reverse doctrine of equivalents, as announced by the Court in the 1898 case *Westinghouse v. Boyden Power Brake Co.*² Hence *Westinghouse* represents forgotten precedent in a different sense than is conventionally thought: the leading patent court in the nation has requested that we forget this precedent, with the result that the case is receding from memory and relevance, unless and until the Supreme Court intervenes.

In *Westinghouse*, the Supreme Court established that two steps are

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1. *Linde Air Prods. Co. v. Morse Dry Dock & Repair Co.*, 246 F. 834, 838 (2d Cir. 1917) (citing *Edison v. Am. Mutoscope & Biograph Co.*, 151 F. 767, 773–74 (2d Cir. 1907)).

2. 170 U.S. 537, 568 (1898).

necessary to determine if an accused product infringes a patent.³ Yes, it is first necessary to analyze whether an accused product falls within the literal language of the patent claims.⁴ But even if it does, infringement is not proven if the accused infringer has so far changed the principle of the patented invention as to create a new, substantially superior innovation that solves the problem in the prior art in a way the patented invention failed to do.⁵ The Court in *Westinghouse* ruled that just as “a charge of infringement is sometimes made out, though the letter of the claims be avoided . . . [t]he converse is equally true.”⁶ In other words, just as there is an affirmative doctrine of equivalents to allow patent holders to establish that an infringer really has appropriated a patented invention despite avoiding the literal scope of the claims, so too there is a *reverse doctrine of equivalents* to allow accused infringers to establish that the patented invention has not been appropriated despite the fact that the claim language semantically reads on the accused device.⁷ In 1950 the Supreme Court referred to the “wholesale realism” of this doctrine, because it prevents patent infringement from being reduced to a mechanical, linguistic exercise that fails to probe the substance of the patent infringement question.⁸

For nearly one hundred years following *Westinghouse*, the reverse doctrine of equivalents was a necessary safety valve in patent law to ensure that granting the patent monopoly did not impede the “progress” sought by the Intellectual Property Clause of the Constitution.⁹ In cases where the accused product represents a leap forward in the technology far beyond what is disclosed in the asserted patent, society benefits from access to that superior innovation unimpeded and untaxed by the asserted patent. There are over thirty published opinions finding or affirming noninfringement under the reverse doctrine of equivalents between 1898 and the 1982 creation of the Federal Circuit and uncounted additional

3. *Id.* at 568.

4. *See id.* at 568.

5. *See id.* at 572–73.

6. *Id.* at 568 (citing *Mach. Co. v. Murphy*, 97 U.S. 120, 121 (1877)).

7. *See generally* Charles F. Pigott, Jr., *Equivalents in Reverse*, 48 J. PAT. OFF. SOC’Y 291 (1966) (discussing the reverse doctrine of equivalents). Although the doctrine was regularly applied to excuse infringement in the decades between 1898 and the 1982 creation of the Federal Circuit, the term “reverse doctrine of equivalents” was not used prior to Pigott’s article, which perhaps partially explains why precedent applying the doctrine has been forgotten, even by the Federal Circuit. *See* Samuel F. Ernst, *The Lost Precedent of the Reverse Doctrine of Equivalents*, 18 VAND. J. ENT. & TECH. L. 467, 472 (2016).

8. *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608–11 (1950) (citing *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1898)).

9. U.S. CONST. art. I, § 8, cl. 8.

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unpublished dispositions as well as opinions denying or vacating summary judgment of infringement due to a dispute of fact regarding reverse equivalency.¹⁰ In at least the Second, Fifth, Sixth, Seventh, and Ninth Circuits, and indeed as stated by the Supreme Court itself in *Westinghouse*, reverse equivalency always had to be considered as part of the principal infringement case.¹¹

The reverse doctrine of equivalents enjoyed steady application by the courts in the decades since the 1898 *Westinghouse* case until the 1980s, when the Federal Circuit was created and proceeded to stamp out the doctrine.¹² In the 1980s the Federal Circuit regularly vacated or reversed findings of noninfringement under the reverse doctrine of equivalents to the point where such findings of noninfringement have disappeared altogether.¹³ In 2002 the Federal Circuit proclaimed final victory over the reverse doctrine of equivalents, mischaracterizing it as an “anachronistic exception, long mentioned but rarely applied”¹⁴ Subsequently, the Federal Circuit warned the lower courts that “this court has never affirmed a finding of noninfringement under the reverse doctrine of equivalents.”¹⁵ And it likely never will, unless an intrepid petitioner for certiorari someday convinces the Supreme Court to revive the doctrine.

I. WESTINGHOUSE AND ITS PROGENY

The history of the development of air pressure brakes for trains in the late nineteenth century is yet another case study to debunk what Mark Lemley referred to as “the myth of the sole inventor.”¹⁶ Rather than a lone genius solving all of the problems attendant with such technology in a flash, multiple parties worked on the technology simultaneously, each

10. See generally *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7 (cataloguing cases finding or affirming noninfringement under the reverse doctrine of equivalents).

11. See *Foster Cathead Co. v. Hasha*, 383 F.2d 761, 765 (5th Cir. 1967); *Skirow v. Roberts Colonial House, Inc.*, 361 F.2d 388, 391 (7th Cir. 1966) (citing *N. Star Ice Equip. Co. v. Akshun Mfg. Co.*, 301 F.2d 882, 886 (7th Cir. 1962)); *Craftint Mfg. Co. v. Baker*, 94 F.2d 368, 373 (9th Cir. 1938) (first citing *Westinghouse*, 170 U.S. at 568; and then citing *Cimiotti Unhairing Co. v. Am. Fur Ref. Co.*, 198 U.S. 399, 406–07 (1905)); *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 223 (2d Cir. 1921) (citing *Westinghouse*, 170 U.S. at 568).

12. See *infra* Section I.

13. See *infra* Section II.

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

15. *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008) (citing *Tate Access Floors*, 279 F.3d at 1368).

16. See Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 710 (2012).

contributing incremental improvements to gradually improve the mechanism.¹⁷ Or as the Supreme Court described the development of this technology,

The history of arresting the speed of railway trains by the application of compressed air is one to which the records of the Patent Office bear frequent witness, of a gradual progress from rude and imperfect beginnings, step by step, to a final consummation, which, in respect to this invention, had not been reached when the patent in suit was taken out, and which, it is quite possible, has not been reached to this day.¹⁸

The basic operation of railway air brakes as developed in the late nineteenth century was as follows: an air pump on the engine of the train created and stored a large reservoir of compressed air.¹⁹ A pipe leading from the engine all along the underside of the cars of the train allowed for the release of the compressed air to trigger a brake cylinder on each car, thereby braking the train.²⁰ The problem with this system as originally conceived was that because the compressed air had to travel all along the length of the train through the train pipe to brake each car, the train carriages did not brake simultaneously with the engine or with one another.²¹

This loss proved to be about 1 second per car; so that on a passenger train of 10 cars the time necessary for the pressure to reach the rear car would be 10 seconds; and on a freight train of 50 cars would be nearly a minute. Thus, while for [sic] forward movement of the foremost cars would be checked at once, that of the rearmost cars would not be as promptly checked, and these would come against the cars in front of them with more or less shock, producing more or less discomfort or positive damage. This defect will be appreciated when it is remembered that a train moving at the rate of 45 miles an hour moves 66 feet per second; so that a freight train of 50 cars would run more than half a mile before the brakes could begin to be effective along the entire train.²²

17. *Id.* at 710–11 (“Invention appears in significant part to be a social, not an individual, phenomenon. Inventors build on the work of those who came before, and new ideas are often either ‘in the air’ or result from changes in market demand or the availability of new or cheaper starting materials.”). For a complete history of innovation in the development of the railroads and its relation to the patent system, the author commends to the reader Steven W. Usselman’s excellent book, *REGULATING RAILROAD INNOVATION: BUSINESS, TECHNOLOGY, AND POLITICS IN AMERICA, 1840–1920*, at 97–176 (2002).

18. *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 545 (1898).

19. *Boyden Power-Brake Co. v. Westinghouse Air-Brake Co.*, 70 F. 816, 818 (4th Cir. 1895).

20. *Id.*

21. *Id.*

22. *Westinghouse Air-Brake Co.*, 70 F. at 818.

The Supreme Court in *Westinghouse* examines in excruciating detail the small, incremental steps various researchers took to attempt to solve this problem, each step attended by its own United States patent.²³ Hence, one patent disclosed the installation of auxiliary reservoirs under each car, with each auxiliary reservoir charged with compressed air to brake each car rather than drawing air directly from the main pipe.²⁴ Then, numerous patents were granted on various types of valves to govern the feeding of air from the train pipe to the auxiliary reservoirs and from the auxiliary reservoirs to the brake cylinders, from poppet valves to piston valves to slide valves.²⁵ Next, it was discovered that venting the train pipe at the locomotive and under each car quickened the application of the brakes.²⁶ A large leap forward came with the invention of the automatic brake, which operated not by the application of compressed air to the brake cylinders, but by the reverse action of the escape of air from the auxiliary reservoirs.²⁷

While these improvements allowed for the use of air pressure brakes in shorter, passenger trains, still the problem in the prior art persisted: “[I]t was found, in practice upon long freight trains, that the air from the auxiliary reservoirs did not act with sufficient promptness upon the brakes of the rear cars, where a particularly speedy action was required”²⁸ To address this problem, George Westinghouse, Jr. invented the patent-in-suit in *Westinghouse*, U.S. Patent No. 360,070.²⁹ The Westinghouse patent introduced a triple-valve mechanism under each car, which connected the train pipe, the auxiliary reservoir, and the brake cylinder.³⁰ While the train was running, the auxiliary reservoirs were fully charged with air.³¹ But when the engineer applied the brakes, it resulted in a reduction of air pressure in the train pipe, which opened a passage in each triple-valve for the discharge of compressed air from the auxiliary reservoir and the train pipe to the brake cylinder.³² Westinghouse claimed his invention as having the following limitations:

23. See *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 548–50 (1898).

24. *Id.* at 548–49 (citing U.S. Patent No. 124,404 (filed Mar. 5, 1872)).

25. *Id.* at 549 (first citing U.S. Patent No. 141,685 (filed Aug. 12, 1873); then citing U.S. Patent No. 144,006 (filed Oct. 28, 1873); then citing U.S. Patent No. 163,242 (filed May 11, 1875); and then citing U.S. Patent No. 168,359 (filed Oct. 5, 1875)).

26. *Id.*

27. *Id.* at 547–48 (first citing ‘685 Patent; and then citing U.S. Patent No. 220,556 (filed Oct. 14, 1879)).

28. *Westinghouse*, 170 U.S. at 550.

29. *Id.* at 537 (citing U.S. Patent No. 360,070 (filed Mar. 29, 1887)).

30. *Boyden Power-Brake Co. v. Westinghouse Air-Brake Co.*, 70 F. 816, 818 (1895).

31. *Id.*

32. *Id.* at 818–19.

In a brake mechanism, the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder, and a triple valve having a piston whose preliminary traverse admits air from the auxiliary reservoir to the brake-cylinder, and which by a further traverse admits air directly from the main air-pipe to the brake-cylinder, substantially as set forth.³³

There appears to have been only one problem with Westinghouse's solution—it did not work.³⁴ The Fourth Circuit noted, “[t]his device does not seem to have proved effectual for the special purposes for which it was designed, and [Westinghouse] improved it by a later one, patented to him on July 24, 1888, numbered 376,837, which is not in suit.”³⁵ The Fourth Circuit wrote of Westinghouse's invention, “[i]t was found, on thorough and conspicuous trials, to be imperfect and inefficient, and lacked that essential element of patented devices, utility.”³⁶ The Supreme Court observed of the Westinghouse patent, “[t]his patent, although it introduced a novel feature into the art, does not seem to have been entirely successful in its practical operation”³⁷ The Supreme Court refers to “the fact that the invention in this case was never put into successful operation”³⁸ In short, although Westinghouse was granted a patent, he did not provide a solution to the problem in the prior art, and society did not receive the “Progress” in exchange for his patent that the Constitution would anticipate.

The accused infringer, Boyden Power Brake Company, did provide a solution to the problem with compressed air brakes.³⁹ Boyden used all of the limitations of Westinghouse's invention: The main air pipe, the auxiliary reservoir, the brake cylinder, and the triple-valve.⁴⁰ But Boyden introduced a new element:

He inserted a partition in the form of a brass ring into the triple valve . . . between the chamber containing the valves and the compressed air of the auxiliary reservoir on one hand and the chamber of the piston containing train pipe air on the other, and he opened a port in that partition for the passage of compressed air from the train pipe to the brake cylinder Boyden [thereby] contrived to discharge both train pipe air and auxiliary reservoir air simultaneously into the brake

33. U.S. Patent No. 360,070, at [4] cl. 2 (filed Mar. 29, 1887).

34. *Westinghouse Air-Brake Co.*, 70 F. at 817.

35. *Id.*

36. *Id.* at 823.

37. *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 552 (1898).

38. *Id.* at 562.

39. *Westinghouse Air-Brake Co.*, 70 F. at 823.

40. *Id.* at 826.

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cylinder without using an additional stem or valve or by-passages.⁴¹

This mechanism created a condition whereby when the engineer pulled the brake there was extreme air pressure on the side of the train pipe and minimal air pressure in the auxiliary chamber.⁴² Hence, the valve

is instantly forced open by the greater train-pipe pressure, which then vents freely through the said feed valve-port into the main valve-chamber . . . where it commingles with the auxiliary reservoir air passing through said chamber, and both airs pass together through the port opened by the main valve . . . of the brake-cylinder.⁴³

Through this contrivance the accused train braking mechanism achieved unexpected successful results and finally solved the problem in the prior art:

The whole operation is substantially instantaneous, and the result is that the train-pipe is freely vented at each car, the time of serially or successively applying the brakes of the several cars from one end of the train to the other is reduced to a minimum, and the train is quickly stopped without shock, a result which Mr. Westinghouse did not attain with the device of patent No. 360,070⁴⁴

In analyzing whether the accused Boyden system infringed the Westinghouse patent, the Supreme Court first determined that there was literal infringement—that the Boyden device contained each of the limitations of the Westinghouse claims:

In both complainants' and defendants' devices there is (1) a feeding-in valve to charge the auxiliary reservoir; (2) a valve which complainants call their "main valve," and which the defendants denominate a "graduating valve," which is opened by the preliminary traverse of the piston to admit reservoir air to the brake-cylinder; (3) a release valve which discharges air from the brake-cylinder to the atmosphere; and (4) a quick-action valve . . . which is opened by the further traverse of the piston to admit train-pipe air to the brake-cylinder.⁴⁵

There appeared to be literal infringement of at least claims one and four of the Westinghouse patent.⁴⁶

The Supreme Court concluded, however, that a finding of literal

41. *Id.* at 823–24.

42. *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 570 (1898).

43. *Id.* at 570–71.

44. *Id.* at 571.

45. *Id.* at 565.

46. *Id.* at 568.

infringement was not the end of the liability analysis.⁴⁷ The Court held that in order to find liability, there must also be “substantial identity” between the claimed invention and the accused device—that the two are “equivalent” in substance.⁴⁸ The Court wrote,

But even if it be conceded that the Boyden device corresponds with the letter of the Westinghouse claims, that does not settle conclusively the question of infringement. We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided [i.e., the doctrine of equivalents]. *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 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.⁴⁹

The Court held that “[a]n infringement . . . involves substantial identity, whether that identity be described by the terms, ‘same principle,’ same ‘modus operandi,’ or any other.”⁵⁰

The Court then proceeded to analyze whether the Boyden device was substantially different from the Westinghouse claims, not only technologically, but also whether it was practically and commercially superior.⁵¹ Technologically, the Court ruled that the Boyden device contained a “radical departure from the Westinghouse patent . . . in the partition . . . separating the valve-chamber . . . from the piston-chamber.”⁵² This partition resulted in the Boyden device operating in a substantially different manner than the Westinghouse patent through “the differential pressure theory” described above.⁵³ “In a word, this partition maintains upon the outside of [the] valve . . . a much higher pressure than upon the inside, the effect of which is to open [the] feed-valve . . . and admit a full volume of train-pipe air upon the brake-cylinder.”⁵⁴ Although both inventions had the function of engaging the brake cylinder through air pressure, “The means used in accomplishing this function are so different that we find it impossible to say, even in favor of a primary

47. *Westinghouse*, 170 U.S. at 568 (citing *Mach. Co. v. Murphy*, 97 U.S. 120, 125 (1878)).

48. *Id.* (quoting *Burr v. Duryee*, 68 U.S. 531, 572–73 (1864)).

49. *Id.* (emphasis added) (citing *Mach. Co.*, 97 U.S. at 126).

50. *Id.* (quoting *Burr*, 68 U.S. at 572–73).

51. *Id.* at 570–73.

52. *Westinghouse*, 170 U.S. at 570.

53. *Id.* at 572.

54. *Id.* at 571.

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patent, that they are mechanical equivalents.”⁵⁵ Not only was the Boyden system therefore technologically superior to the asserted patent, it was also practically and commercially superior. The Court reasoned,

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.⁵⁶

Accordingly, the Boyden braking system escaped infringement under the reverse doctrine of equivalents and was made available for the benefit of the public.⁵⁷

One might argue that the public would have benefited from Boyden’s innovation even if infringement had been found, because Westinghouse could have appropriated Boyden’s improvement.⁵⁸ This is incorrect, however, because Boyden’s invention was also patented and would have prevented such appropriation by Westinghouse.⁵⁹ Hence, Westinghouse’s patent and Boyden’s patent were “blocking patents” in relation to one another.⁶⁰ And although it is often hypothesized that the holders of blocking patents will have the incentive to negotiate a cross-license, the truth is that this situation often ends up in contentious, wasteful litigation, rather than an amicable cross-license.⁶¹ *Westinghouse* is just one more example of the failure of the blocking patents hypothesis. In order for the public to benefit from Boyden’s innovation, the reverse doctrine of equivalents was necessary to excuse literal infringement.

Hence was born the reverse doctrine of equivalents. The Supreme Court reaffirmed the validity of this doctrine in dictum fifty years later in *Graver Tank & Manufacturing Co. v. Linde Air Products Co.*⁶² In affirming the continued viability of the affirmative doctrine of equivalents, the Court also noted that the reverse doctrine of equivalents was alive and well:

55. *Id.*

56. *Id.* at 572.

57. *Westinghouse*, 170 U.S. at 573 (holding that the Boyden device did not infringe Westinghouse’s patent).

58. See Samuel F. Ernst, *Protecting the Boundaries: Unclaimed Consideration in the Patentee’s Social Contract*, 18 TUL. J. TECH. & INTELL. PROP. 1, 40–41 (2015).

59. See U.S. Patent No. 481,135 (filed Aug. 16, 1892).

60. Compare *id.* (showing a design for a fluid pressure brake), with U.S. Patent No. 360,070 (filed Mar. 29, 1887) (showing a design for a fluid pressure automatic brake mechanism).

61. See *Protecting the Boundaries*, *supra* note 58, at 41–42.

62. See 339 U.S. 605, 608 (1950) (citing *Winans v. Adam*, 56 U.S. 330, 341 (1854)).

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.⁶³

In the meantime, the reverse doctrine of equivalents had been fully embraced and developed by the lower courts,⁶⁴ contrary to the Federal Circuit's peculiar assertion that the doctrine is "one anachronistic exception, long mentioned but rarely applied."⁶⁵ Because the Second, Fifth, Sixth, Seventh, and Ninth Circuits developed a particularly robust articulation of the doctrine, requiring reverse equivalents to be considered as part of the *prima facie* infringement case, it is useful to analyze a few of these cases in detail.⁶⁶

In *Mead Digital Systems, Inc. v. A.B. Dick Co.*, the Sixth Circuit confronted, *inter alia*, U.S. Patent No. 3,596,275 ("the Sweet Patent"), which claims an apparatus for ink jet printing.⁶⁷ In general terms, the Sweet Patent disclosed a printer that controlled the trajectory of ink droplets sprayed onto a deflection plate by maintaining a constant voltage on the deflection plate and placing a variable voltage on the ink droplets.⁶⁸ The accused device was an ink jet printer produced by Mead called the DIJIT printer.⁶⁹ The DIJIT printer also deflected droplets onto a recording medium by charging the droplets and the recording medium, and the Sixth Circuit found that the DIJIT printer "embodie[d] virtually all of the principles and techniques" disclosed in the patents-in-suit.⁷⁰ However,

63. *Id.* at 608–09 (citing *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1898)).

64. *See, e.g.*, *Mead Digital Sys., Inc. v. A.B. Dick Co.*, 723 F.2d 455, 462 (6th Cir. 1983); *Foster Cathead Co. v. Hasha*, 382 F.2d 761, 765 (5th Cir. 1967); *Skirow v. Roberts Colonial House*, 361 F.2d 388, 391 (7th Cir. 1966) (citing *N. Star Ice Equip. Co. v. Akshun Mfg. Co.*, 301 F.2d 882, 886 (7th Cir. 1962)); *Craftint Mfg. Co. v. Baker*, 94 F.2d 369, 373 (9th Cir. 1938) (citing *Westinghouse*, 170 U.S. at 568); *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921) (quoting *Westinghouse*, 170 U.S. at 568).

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

66. *See Mead Digital Sys.*, 723 F.2d at 462; *Foster Cathead Co.*, 382 F.2d at 765; *Skirow*, 361 F.2d at 391 (citing *N. Star Ice Equip. Co.*, 301 F.2d at 886); *Craftint Mfg. Co.*, 94 F.2d at 373 (citing *Westinghouse*, 170 U.S. at 568); *Morgan Constr. Co.*, 277 F. at 224 (quoting *Westinghouse*, 170 U.S. at 568).

67. 723 F.2d at 458 (citing U.S. Patent No. 3,596,275 (filed July 27, 1971)).

68. *Id.* at 458.

69. *Id.* at 461.

70. *Id.*

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the court found that the accused DIJIT printer deflected droplets in a substantially different way from the Sweet Patent.⁷¹ Whereas the patented invention used many different charge levels to direct droplets onto many different locations on the recording medium, the DIJIT printer employed the elegant solution of using only two charge levels: one charge level of one hundred volts deflected droplets onto a catcher, such that they did not reach the recording medium; a second charge level of zero volts permitted the droplets to travel undeflected onto the recording medium.⁷² The DIJIT printer then accomplished the task of directing the droplets to precise locations on the recording medium by adding sophisticated technology that was not disclosed in the asserted Sweet Patent: “Those concepts include the coordination of multiple jets, interception for creating an apparent discontinuity in the image, and a charging and deflection system whereby the final picture is not characteristic of the charging signals.”⁷³ By contrast, “The Sweet [P]atent does not contemplate a high speed character printer with coordinated multiple jets and a deflection system whereby all charged droplets are deflected into a collector and uncharged droplets are deposited on the recording medium to form the desired characters.”⁷⁴ The court found that “[t]he DIJIT printer, quite simply, is a more sophisticated device”⁷⁵ Accordingly, the Sixth Circuit affirmed the district court in concluding that although the DIJIT printer fell within the literal scope of the Sweet Patent’s claims, it escaped infringement through the “application of the doctrine of equivalents.”⁷⁶ The DIJIT printer was “a significant advance” and was simply not the equivalent of the inventions disclosed in the Sweet Patent.⁷⁷

The patent holder argued that once the court determined that the accused device fell within the literal scope of the claims, that was the end of the matter; infringement was proven.⁷⁸ The Sixth Circuit rejected this contention, calling it the “so-called doctrine of literal infringement,” which “continues to live in the cases despite repeated pronouncements that infringement is not a mere matter of words.”⁷⁹ Although the Supreme Court said in *Graver Tank* that “[i]f accused matter falls clearly within

71. *See id.*

72. *Mead Dig. Sys.*, 723 F.2d at 461.

73. *Id.* at 464.

74. *Id.*

75. *Id.*

76. *Id.*

77. *Mead Dig. Sys.*, 723 F.2d at 464.

78. *Id.* at 462 (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607 (1950)).

79. *Id.* (citing 1 DONALD S. CHISUM, CHISUM ON PATENTS § 18.04 (1983)).

the claim, infringement is made out and that is the end of it,” the Sixth Circuit pointed out that “two paragraphs after announcing that doctrine the Court recognizes that the doctrine of equivalents applies even when the accused device falls within the literal words of the claim.”⁸⁰ The Sixth Circuit lamented that

Courts, however, unfortunately continue to pay lip service to the doctrine of literal infringement as though it were the rule . . . Perhaps we are embarrassed to expose the ‘wholesale realism’ which controls many infringement cases, and we choose instead to present the facade of precision and certainty which attends the doctrine of literal infringement.⁸¹

The rule in the Sixth Circuit, however, was that a finding of literal infringement was not the end of the story.⁸² The court had to consider whether the accused device was materially the same as the patented invention or if it departed substantially from the principle of the invention.⁸³ Because the accused DIJIT printer was a far more sophisticated device that relied on different principles than the Sweet Patent, it avoided infringement under the reverse doctrine of equivalents.⁸⁴ The court acknowledged that “[t]his result will not set well with those who demand rules in this area and treat patent law problems as questions of semantics.”⁸⁵ But the reverse doctrine of equivalents was necessary because “unsparing logic must be tempered with wholesale realism.”⁸⁶ Accordingly, the public received the benefit of the more sophisticated DIJIT printer unimpeded and untaxed by a patent that failed to disclose a modern, operable printer.

The Second, Fifth, Seventh, and Ninth Circuits also fully embraced the reverse doctrine of equivalents prior to the creation of the Federal Circuit.⁸⁷ In all of these circuits, a finding of literal infringement was not

80. *Graver Tank*, 339 U.S. at 607–09; *Mead Dig. Sys.*, 723 F.2d at 464.

81. *Mead Dig. Sys.*, 723 F.2d at 462 (citing *Graver Tank*, 339 U.S. at 608).

82. *Id.* at 463.

83. *Id.*

84. *Id.* at 464.

85. *Id.* at 463.

86. *Mead Dig. Sys.*, 723 F.2d at 463 (citing *Royal Typewriter Co. v. Remington Rand, Inc.*, 168 F.2d 691, 692 (2d Cir. 1948)).

87. See *Foster Cathead Co. v. Hasha*, 383 F.2d 761, 765 (5th Cir. 1967); *Skirow v. Roberts Colonial House, Inc.*, 361 F.2d 388, 391 (7th Cir. 1966) (citing *N. Star Ice Equip. Co. v. Akshun Mfg. Co.*, 301 F.2d 882, 886 (7th Cir. 1962)); *Craftint Mfg. Co. v. Baker*, 94 F.2d 368, 373 (9th Cir. 1938) (first citing *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1898); and then citing *Cimiotti Unhairing Co. v. Am. Fur Ref. Co.*, 198 U.S. 399, 406–07 (1905)); *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 223 (2d Cir. 1921) (citing *Westinghouse*, 170 U.S. at 568).

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the end of the liability analysis.⁸⁸

In *Morgan Construction Co. v. Donner Steel Co.*, the Second Circuit reversed a finding of infringement despite the fact that the claims were literally infringed.⁸⁹ The court cited to *Westinghouse* to articulate the law as follows:

“Of the [patent] claims quoted, the first will undoubtedly, if read literally, cover defendant’s device; but this is not final. It remains to inquire whether the alleged infringement displays ‘substantial identity’ with the thing invented.”⁹⁰

The Ninth Circuit cited *Westinghouse* to articulate this same infringement analysis in *Craftint Manufacturing Co. v. Baker*:

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 equivalents. Similarity of result is not sufficient . . .⁹¹

The Fifth Circuit stated that this mode of infringement analysis was well settled in *Foster Cathead Co. v. Hasha*:

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.⁹²

So too the Seventh Circuit held in 1966, “Neither a literal application of claim phraseology nor similarity of result is sufficient to establish infringement. There must be a real identity of means, operation, and result.”⁹³

What is striking about these decisions is that the reverse doctrine of equivalents is not an affirmative defense to be alleged by the defendant, as the Federal Circuit has ruled.⁹⁴ Rather, proving infringement requires

88. See *Foster Cathead Co.*, 383 F.2d at 765; *Skirow*, 361 F.2d at 391; *Craftint Mfg. Co.*, 94 F.2d at 373; *Morgan Constr. Co.*, 277 F. at 223.

89. See 277 F. at 224.

90. *Id.* (quoting *Westinghouse*, 170 U.S. at 568).

91. *Craftint Mfg. Co.*, 94 F.2d at 373 (citing *Westinghouse*, 170 U.S. 537).

92. *Foster Cathead Co. v. Hasha*, 382 F.2d 761, 765 (5th Cir. 1967) (emphasis added).

93. *Skirow*, 361 F.2d at 391 (citing *N. Star Ice Equip. Co. v. Akshun Mfg. Co.*, 301 F.2d 882, 886 (7th Cir. 1962)).

94. See *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1123–24 (Fed. Cir. 1985) (“When a patentee establishes literal infringement, the accused infringer may undertake the burden of going forward to establish the fact of non-infringement under the reverse

a showing of “substantial identity” in addition to literal infringement.⁹⁵

In other words, the question of patent infringement involves more than a linguistic exercise of examining the words of a patent claim. Patent infringement requires an analysis of the actual principle of the patented invention and the substance of the technology accused, regardless of how the patent holder has chosen to draft her claims. As the Second Circuit put the matter in *Linde Air Products Co. v. Morse Dry Dock & Repair Co.*, “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.”⁹⁶

This was not a wild notion prior to the creation of the Federal Circuit, but standard operating procedure.⁹⁷ Charles Pigott wrote in 1966 that “[i]t 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.”⁹⁸ Rather, the patentee also has the further burden of showing that the accused product is “the equivalent” of the patented invention.⁹⁹ Hence, the patent holder must make the same showing as it would with respect to equivalent infringement, that the accused device performs substantially the same function in substantially the same way to achieve substantially the same result.¹⁰⁰ Pigott writes, “[T]he patentee . . . 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.”¹⁰¹

Hence, the reverse doctrine of equivalents addresses the problem

doctrine of equivalents.”).

95. See *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 482 (“[T]here is a body of precedent standing for the proposition that reverse equivalents must *always* be considered prior to finding infringement.”) (emphasis added); see also John F. Duffy, *Counterproductive Notice in Literalistic Versus Peripheral Claiming*, 96 B.U. L. REV. 1197, 1205 (2016) (“But under the traditional approach to peripheral claiming, the analysis in *Boyden Power Brake* was not a *defense*; it was a *required* part of infringement analysis.”) (emphasis added).

96. 246 F. 834, 838 (2d. Cir. 1917) (citing *Edison v. Am. Mutoscope & Biograph Co.*, 151 F. 767, 774 (2d Cir. 1907)).

97. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 473 (“In the years between 1898 . . . 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.”).

98. Pigott, *supra* note 7, at 291–92 (emphasis added).

99. *Id.* at 292.

100. *Id.*

101. *Id.*

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that Dan Burk and Mark Lemley have identified with claim construction—“that courts define the scope of legal rights not by reference to the invention but by reference to semantic debates over the meaning of words chosen by lawyers.”¹⁰² In the same vein, John Duffy writes that the Federal Circuit’s “literalistic claiming method deviates sharply from the peripheral claiming method that was dominant throughout most of the twentieth century.”¹⁰³ The reverse doctrine of equivalents, like the nonliteralistic claiming method that these scholars advocate for, allows the courts to “pay more attention to the patentee’s actual description of the invention and less to the words of the claims themselves in deciding the patent’s importance and coverage, thus avoiding abuse of the litigation process by patentees who invent one thing and later claim to own something else entirely.”¹⁰⁴ More critically, however, the reverse doctrine of equivalents allows the courts to take into consideration the significance of the accused product in analyzing infringement.¹⁰⁵ If the accused product is a greater innovation than the invention claimed in the asserted patent, (substantially superior to the patented invention in solving the problem in the prior art), then the court can liberate the accused innovation from the snare of literal infringement to the benefit of the public.¹⁰⁶

The Federal Circuit was incorrect in concluding that the reverse doctrine of equivalents was an “anachronistic exception, long mentioned but rarely applied”¹⁰⁷ The doctrine was regularly (even if not frequently) applied to excuse infringement between 1898 and 1988.¹⁰⁸ This author has located multiple published opinions either finding or affirming noninfringement under the reverse doctrine of equivalents in the decades of that era: “Four opinions in the 1900s, two opinions in the 1910s, two opinions in the 1920s, eight opinions in the 1930s,” two opinions in the 1940s, three opinions in the 1960s, four opinions in the

102. Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1746 (2009).

103. Duffy, *supra* note 95, at 1197. Although Burk and Lemley argue that the problems associated with literalistic claiming emerged with the peripheral claiming system of the 1870s, Duffy clarifies that peripheral claiming actually allowed for probing into the essence of the invention because the patentee did not necessarily have rights to everything within the literal bounds of the claim. Rather, it was the Federal Circuit’s method of literalistic claim construction that arose in the 1980s that divorced claim construction from the true essence of the invention. *Id.* at 1202–03; Burk & Lemley, *supra* note 102, at 1748–49.

104. Burk & Lemley, *supra* note 102, at 1747.

105. See Pigott, *supra* note 7, at 296.

106. See *id.* at 295–96.

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

108. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 476–77.

1970s, and seven opinions in the 1980s.¹⁰⁹ Hence, the doctrine was not applied frequently; it was reserved to excuse infringement by substantial innovations.¹¹⁰ But it was a regular mainstay of the infringement analysis, and a critical component of the patent laws to safeguard the quid pro quo

109. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 477–78 (first citing *Severy Process Co. v. Harper & Bros.*, 113 F. 581, 584–86 (S.D.N.Y. 1902); then citing *Standard Computing Scale Co. v. Computing Scale Co.*, 126 F. 639, 649 (6th Cir. 1903); then citing *Gen. Elec. Co. v. Allis-Chalmers Co.*, 171 F. 666, 669 (D. N.J. 1909); then citing *Duncan v. Cincinnati Butchers' Supply Co.*, 171 F. 656, 665–66 (6th Cir. 1909); then citing *Am. Stoker Co. v. Underfeed Stoker Co. of Am.*, 182 F. 642, 653 (W.D. Pa. 1910); then citing *Borland v. N. Tr. Safe Deposit Co.*, 212 F. 178, 184 (N.D. Ill. 1914); then citing *Morgan Constr. Co. v. Donner Steel Co.*, 277 F. 221, 224 (2d Cir. 1921); then citing *Cadwell v. Firestone Tire & Rubber Co.*, 13 F.2d 483, 487 (E.D.N.Y. 1926); then citing *Baker Perkins Co. v. Thomas Roulston, Inc.*, 52 F.2d 799, 801 (E.D.N.Y. 1931); then citing *Cinema Patents Co. v. Warner Bros. Pictures, Inc.*, 55 F.2d 948, 956 (E.D.N.Y. 1932); then citing *Esnault-Pelterie v. Chance Bought Corp.*, 56 F.2d 393, 405 (E.D.N.Y. 1932); then citing *T.H. Symington & Son, Inc. v. Symington Co.*, 9 F. Supp. 699, 708 (D. Md. 1935); then citing *Gen. Elec. Co. v. Amperex Elec. Prods.*, 15 F. Supp. 438, 440 (E.D.N.Y. 1936); then citing *Radio Corp. of Am. v. Mackay Radio & Tel. Co.*, 16 F. Supp. 610, 613–14 (E.D.N.Y. 1936); then citing *Craftint Mfg. Co. v. Baker*, 94 F.2d 369, 373 (9th Cir. 1938); then citing *British Acoustic Films, Ltd. v. Elec. Research Prods.*, 29 F. Supp. 531, 535–36 (D. Del. 1939); then citing *Meikle v. Timken-Detroit Axle Co.*, 44 F. Supp. 460, 465 (E.D. Mich. 1942); then citing *Wheeling Stamping Co. v. Standard Cap & Molding Co.*, 60 F. Supp. 533, 537 (D. Md. 1945); then citing *Nickerson v. Bearfoot Sole Co.*, 311 F.2d 858, 881 (6th Cir. 1963); then citing *Skirow v. Roberts Colonial House, Inc.*, 361 F.2d 388, 391 (7th Cir. 1966); then citing *Foster Cathed Co. v. Hasha*, 382 F.2d 761, 766–67 (5th Cir. 1967); then citing *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); then citing *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); then citing *Leesona Co. v. United States*, 530 F.2d 896, 906 (Ct. Cl. 1976); then citing *Harris v. NRM Co.*, No. C72–1310, 1976 U.S. Dist. LEXIS 15049, at *11 (N.D. Ohio June 10, 1976); then citing *Foster Wheeler Corp. v. Babcock & Wilcox Co.*, 512 F. Supp. 792, 802–03 (S.D.N.Y. 1981); then citing *Mead Dig. Sys., Inc. v. A.B. Dick Co.*, 723 F.2d 455, 462–64 (6th Cir. 1983); then citing *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); then citing *Brenner v. Recognition Equip. Inc.*, 593 F. Supp. 1275, 1278 (S.D.N.Y. 1984); then citing *Technicon Instruments Corp. v. Alpkem Corp.*, 664 F. Supp. 1558, 1575 (D. Or. 1986), *aff'd* 1987 U.S. App. LEXIS 17092, at *1 (Fed. Cir. Dec. 22, 1987); then citing *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); and then citing *Precision Metal Fabricators, Inc. v. Jetstream Sys. Co.*, 693 F. Supp. 814, 819 (N.D. Cal. 1988)).

110. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 478 (citing *Smithkline Diagnostics, Inc.*, 662 F. Supp. at 628, *rev'd*, 859 F.2d at 890 (“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*, 591 F. Supp. 464, 471 (N.D. Cal. 1984), *rev'd*, 775 F.2d at 1122–23 (vacating summary judgment of noninfringement under the reverse DOE and remanding for trial because there was a genuine issue of material fact as to whether the item performed in substantially the same way); *see, e.g., Mead Dig. Sys.*, 723 F.2d at 462–64; *Precision Metal Fabricators, Inc.*, 693 F. Supp. at 819; *Technicon Instruments Corp.*, 664 F. Supp. at 1575, *aff'd*, 1987 U.S. App. LEXIS 17092, at *1; *Brenner*, 593 F. Supp. at 1278; *Foster Wheeler Corp.*, 512 F. Supp. at 801–02.

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of the patent system.¹¹¹ Moreover, the number of published opinions cited above finding or affirming noninfringement under the reverse doctrine of equivalents does not include unpublished dispositions or opinions denying or vacating summary judgment of infringement due to a dispute of fact with respect to reverse equivalency.¹¹² In short, the reverse doctrine of equivalents was an essential safety valve in the infringement analysis prior to the creation of the Federal Circuit, which safeguarded dozens of important innovations from the patent monopoly.¹¹³

II. THE FEDERAL CIRCUIT'S DISPOSAL OF *WESTINGHOUSE*

It seems odd to conceive of a court that favors one class of litigants over another, but the evidence is undisputable that the Federal Circuit was created to develop the law in favor of patent holders. In her article on the origins of the Federal Circuit, Judge Marion T. Bennett describes a period of economic malaise in the late 1970s in which it was felt that “technological innovation was being impeded by the lack of uniformity in application of the patent laws.”¹¹⁴ More than a lack of uniformity, however, it was felt that the regional circuit courts were affirmatively hostile to patent rights, according to Judge Bennett:

Still another factor entered the picture to diminish the patent system further as an incentive to industrial innovation. Some of the regional circuit courts, expressing strong feelings about the dangers of monopoly and having a low regard for the expertise of the Patent Office, tended not to give any deference to the administrative examination process and invalidated many patents. It thus became important to make sure, where possible, that a patent suit be brought in the least hospitable forum.¹¹⁵

It was against this backdrop that the Court of Appeals for the Federal Circuit was created in 1982.¹¹⁶

Given that the origins of the court were grounded not only in a desire to seek uniformity in patent law, but to strengthen patent rights, it is not

111. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 488.

112. *See, e.g.*, *Jewish Hosp. of St. Louis v. Idexx Labs.*, 973 F. Supp. 24, 28 (D. Me. 1997); *Union Carbide Corp. v. Tarancon Corp.*, 682 F. Supp. 535, 541–42 (N.D. Ga. 1988).

113. *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 505–06. “[T]he 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.’” *Id.* at 497 (quoting Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75, 75 (1994)).

114. Marion T. Bennett, *The United States Court of Appeals for the Federal Circuit—Origins*, in *THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT: A HISTORY: 1990–2002* 3, 10 (2002).

115. *Id.* at 11.

116. *Id.* at 15.

surprising that some of the early judges on the court felt this to be a peculiar aspect of their judicial mission.¹¹⁷ One of the Federal Circuit's earliest reforms was to establish what the Sixth Circuit in *Mead Digital Systems* called the "doctrine of literal infringement";¹¹⁸ the notion that once a court determines that an accused product falls within the literal scope of the claim language, the infringement analysis is concluded and liability is established.¹¹⁹ A barrier to this doctrine is, of course, the reverse doctrine of equivalents, because, as described above, it requires proof of "substantial identity" in addition to literal infringement. And so the reverse doctrine of equivalents had to go. But because it was enshrined in a Supreme Court case, it could not be overruled by the Federal Circuit directly.

The Federal Circuit began by consistently vacating or reversing district court findings of noninfringement under the reverse doctrine of equivalents.¹²⁰ In *SRI International v. Matsushita Electric Corporation of America*, the en banc Federal Circuit decided that the question of reverse equivalency was no longer part of the affirmative infringement case, but rather, an affirmative defense to be asserted by the accused infringer.¹²¹ "When 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."¹²² This makes the case more difficult for the accused infringer, who now bears the burden of showing reverse equivalency.¹²³ The plaintiff can rest its case on a showing of literal (or semantic) infringement and no longer bears the burden of showing "substantial identity," as had been the case for the prior one hundred years. Hence, "substantial identity" would no longer be considered in every case and the "doctrine of literal infringement" was established.¹²⁴

117. See Pauline Newman, *The Court of Appeals for the Federal Circuit, After Three Decades*, 23 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 553, 555 (2013) ("The proposal to reorganize the federal judicial structure arose not from abstraction or ideology, but from the practical urgency of recovering the incentive that can be provided by an effective patent system.").

118. 723 F.2d 455, 462 (6th Cir. 1983) (citing *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950)).

119. See *id.*

120. See, e.g., *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); *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).

121. 775 F.2d at 1123–24.

122. *Id.*

123. See *id.*

124. See *Texas Instruments Inc. v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1176 (Fed.

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Moreover, the en banc court overruled a previous case to determine that the reverse doctrine of equivalents was a question of fact, not an equitable determination or a question of law.¹²⁵ This ruling means that the accused infringer cannot readily use the reverse doctrine of equivalents as a tool to obtain summary judgment and thereby avoid the settlement pressure and uncertainty presented by the specter of a trial.

The fact that reverse equivalency is a question of fact did not, however, prevent the court from reversing a finding of noninfringement under the reverse doctrine of equivalents in *Smithkline Diagnostics, Inc. v. Helena Laboratories Corporation* and, rather than remanding for reconsideration, finding on appeal that the defense failed.¹²⁶ In a peculiarly fact-like conclusion for a court of appeals to make, the Federal Circuit found that the accused “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.”¹²⁷

The court further restricted the doctrine in *Texas Instruments, Inc. v. United States International Trade Commission* by holding that it only applies as a defense to literal infringement, not equivalent infringement.¹²⁸ The court held that “[t]he reverse doctrine of equivalents comes into consideration only when literal infringement is apparent. Since the . . . claims are not literally infringed, the reverse doctrine of equivalents does not apply.”¹²⁹ Hence, because the asserted patent was found to be infringed by equivalents, no reverse equivalency defense could be raised.¹³⁰ There is no rationale for restricting a doctrine intended to protect substantial improvements from being used in cases where infringement is only by equivalents. If the accused product does not even fall within the literal scope of the claims, there is all the more reason to consider whether it is a substantial improvement over the principle of the

Cir. 1993) (declining to consider the accused infringer’s reverse doctrine of equivalents defense because a party cannot raise a reverse doctrine of equivalent argument simply by raising a defense to literal infringement or doctrine of equivalent infringement); *Rolls-Royce Ltd. v. GTE Valeron Corp.*, 800 F.2d 1101, 1108 (Fed. Cir. 1986) (declining to consider reverse equivalency because the accused infringer did not raise it as an affirmative defense at trial and finding the attack on the district court’s failure to discuss reverse equivalency bold, reckless, and improper).

125. *SRI Int’l*, 775 F.2d at 1126 (overruling *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760 (Fed Cir. 1983)).

126. 662 F. Supp. 622, 628 (E.D. Tex. 1987) *rev’d*, 859 F.2d 878, 889–90 (Fed. Cir. 1988).

127. *Smithkline Diagnostics, Inc.*, 859 F.2d at 890.

128. 846 F.2d 1369, 1372 (Fed. Cir. 1988) (opinion on denial of rehearing).

129. *Id.*

130. *Id.*

patented invention.¹³¹

Perhaps even more influential than these rulings rejecting reverse equivalency in deterring district courts from relying on the doctrine has been the Federal Circuit's hostile rhetoric in discussing the doctrine.¹³² In *Tate Access Floors, Inc. v. Interface Architectural Resources, Inc.*, the court called the doctrine "one anachronistic exception, long mentioned but rarely applied."¹³³ This is, of course, incorrect because the doctrine was regularly applied throughout the twentieth century, as discussed above. Nonetheless, the court not only rejected the defense in *Tate Access* but found it necessary to point out that "[n]ot once has this court affirmed a decision finding noninfringement based on the reverse doctrine of equivalents."¹³⁴ The court repeated this admonition in *Roche Palo Alto LLC v. Apotex, Inc.*: "The reverse doctrine of equivalents is rarely applied, and this court has never affirmed a finding of noninfringement under the reverse doctrine of equivalents."¹³⁵ Indeed, in *Tate Access*, the court appears to make a prediction that it *never will* affirm a finding of noninfringement under the reverse doctrine of equivalents, stating, "Even were this court likely *ever* to affirm a defense to literal infringement based on the reverse doctrine of equivalents, the presence of one anachronistic exception, long mentioned but rarely applied, is hardly reason to create another."¹³⁶ Such statements can only be seen as warnings to the district courts that findings of noninfringement under the reverse doctrine of equivalents are not likely to survive on appeal.

The Federal Circuit's rationale for its hostility to the reverse doctrine of equivalents is an argument that Congress implicitly overruled the doctrine by passing 35 U.S.C. § 112 to provide for strict disclosure and claim definiteness requirements:

Not once has this court affirmed a decision finding noninfringement based on the reverse doctrine of equivalents. And with good reason: when Congress enacted 35 U.S.C. § 112, after the decision in *Graver*

131. Take the example of an asserted hypothetical patent that contains claim limitations A, B, and C. If the accused device contains elements A, B, and C that literally read on the claim limitations, then the accused infringer may be able to argue noninfringement under the reverse doctrine of equivalents (however unlikely it is that the defense will succeed). But under *Texas Instruments*, if the accused product reads on limitations A and B literally, but meets limitation C only by equivalents, the reverse doctrine of equivalents is not available as a defense. This rule makes no sense.

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

133. *Id.*

134. *Id.*

135. 531 F.3d 1372, 1378 (Fed. Cir. 2008) (citing *Tate Access Floors*, 279 F.3d at 1368).

136. *Tate Access Floors*, 279 F.3d at 1368 (emphasis added).

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.¹³⁷

The argument appears to be that the reverse doctrine of equivalents may have been necessary prior to the enactment of § 112 because patent claims were not necessarily definite in their scope and resort was had to the patent specification to determine the true principle of the patented invention.¹³⁸ Now that patent claims are required to be clear and definite, there is no need to inquire further into the principle of the invention once the accused product is found to fall within the literal scope of the claims.¹³⁹ The principle of the invention is what is set forth in the claims.¹⁴⁰

This argument fails for two reasons. First, the reverse doctrine of equivalents as classically articulated in *Westinghouse* and the precedent discussed above was less focused on the scope of the patented invention and more concerned with the nature and value of the accused innovation.¹⁴¹ The question was whether the accused product was technically and practically superior to the patented invention, such that it did not appropriate the true principle of the invention and, in equity, should not be enjoined or taxed by the patent. This remains a relevant inquiry after the passage of § 112 because there remains a need to protect valuable innovations from the patent monopoly.

The second reason why the Federal Circuit's argument is incorrect is that it has already been rejected by the Supreme Court.¹⁴² In *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, the petitioner asked the

137. *Id.* (first citing 35 U.S.C. § 112 (1952); and then citing *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950)).

138. *Id.*; see Nathaniel Durrace, *How the Doctrine of Equivalents May Save Claim Construction*, 33 AIPLA Q. J. 73, 74 (2005) (“[T]he court reasons that 35 U.S.C. § 112 and its requirements are coextensive with the broadest possible reach of the [reverse doctrine of equivalents], rendering it superfluous.”).

139. The Court of Appeals for the Federal Circuit has used “principle” and “equitable scope of the claims” interchangeably following *Tate Access*. See *Roche Palo Alto LLC*, 531 F.3d at 1378 (explaining that the ‘principle’ or ‘equitable scope of the claims’ is established by the same factors).

140. *Id.*

141. See, e.g., *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 572 (1898) (“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.”).

142. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 26 (1997) (citing *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 342 (1961)) (“In the context of infringement, we have already held that pre-1952 precedent survived the passage of the 1952 Act.”).

Court to “speak the death” of the common law doctrine of equivalents.¹⁴³ The petitioner’s “primary argument . . . is that the doctrine of equivalents as set out in *Graver Tank* in 1950, did not survive the 1952 revision of the Patent Act . . . because . . . [the doctrine of equivalents] is inconsistent with the statutory requirement that a patentee specifically ‘claim’ the invention covered by a patent.”¹⁴⁴ The Supreme Court rejected this argument because “[t]he 1952 Patent Act is not materially different from the 1870 Act with regard to claiming, reissue, and the role of the PTO.”¹⁴⁵ The Court further reasoned that

[s]uch minor differences as exist between those provisions in the 1870 and the 1952 Acts have no bearing on the result reached in *Graver Tank*, and thus provide no basis for our overruling it. In the context of infringement, we have already held that pre-1952 precedent survived the passage of the 1952 Act.¹⁴⁶

And in *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, the Court held that the 1952 Patent Act “left intact the entire body of case law on direct infringement.”¹⁴⁷ Hence, the 1952 Patent Act “left intact” the Court’s precedent on reverse equivalency as set forth in *Westinghouse*. The Court makes clear in *Graver Tank* that the reverse doctrine of equivalents is the same doctrine as the doctrine of equivalents, but applied in favor of the accused infringer.¹⁴⁸ Hence, the reverse doctrine of equivalents was not overruled by the passage of § 112, and the Federal Circuit is wrong to suggest otherwise.

The reverse doctrine of equivalents remains good law as a technical matter.¹⁴⁹ But the Federal Circuit’s rulings and pronouncements on the issue have, as a practical matter, done away with the doctrine.¹⁵⁰ Although the doctrine was regularly applied in every decade from the

143. *Id.* at 21.

144. *Id.* at 25 (citing 35 U.S.C. § 112 (1952)).

145. *Id.* at 26.

146. *Id.* (citing *Aro Mfg. Co.*, 365 U.S. at 342).

147. *Aro Mfg. Co.*, 365 U.S. at 342.

148. *See Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608–09 (1950) (“The wholesale realism of this doctrine [of equivalents] is not always applied in favor of a patentee but is sometimes used against him.”).

149. *Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1339 (Fed. Cir. 2009) (“The Supreme Court has recognized . . . [the reverse doctrine of equivalents] to be a viable defense, even if it is rarely asserted.”).

150. *See Tate Access Floors v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1368 (Fed. Cir. 2002); *Roche Palo Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008); *see also* Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 118 (2004) (“The Federal Circuit has never applied the doctrine [of equivalents] to excuse infringement, and it recently criticized the defense.”).

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1900s through the 1980s, it has never been applied since.¹⁵¹ This author has located zero published opinions applying the reverse doctrine of equivalents to excuse literal infringement in the 1990s, zero such opinions in the 2000s, and zero such opinions in the current decade. There has not been a published opinion finding or affirming noninfringement under the doctrine since the 1988 opinion of the Northern District of California in *Precision Metal Fabricators, Inc. v. Jetstream Systems Co.*¹⁵² Unless and until the en banc Federal Circuit or the Supreme Court revives the doctrine, it is effectively overruled.

III. THE URGENT NEED FOR THE REVERSE DOCTRINE OF EQUIVALENTS

Whatever need there was to reform patent law in favor of patent holders in the late 1970s, the pendulum has certainly now swung too far in the opposite direction. Many scholars and commentators have noted the growth of a “patent thicket”—a vast growth of low quality patents, unpracticed by their owners, that serve as a tax on or downright barrier to innovation.¹⁵³ The majority of patents are never commercialized,¹⁵⁴ and as Christopher Cotropia has observed, “Uncommercialized patents . . . fuel the use of patents as a litigation tool.”¹⁵⁵ The annual cost of patent litigation is staggering—one study concluded that accused infringers spent approximately sixteen billion dollars per year in litigation costs to defend against patent infringement claims by the late 1990s.¹⁵⁶ Another study found that patent troll litigation resulted in direct litigation costs for defendants of twenty-nine billion dollars in 2011.¹⁵⁷ This does not include the indirect costs of litigation, such as time spent by engineers and other

151. *Tate Access Floors*, 279 F.3d at 1368 (“Not once has this court affirmed a decision finding noninfringement based on the reverse doctrine of equivalents.”); see *The Lost Precedent of the Reverse Doctrine of Equivalents*, *supra* note 7, at 473, 477–78 (“After its inception in 1982, the [Federal Circuit] began the practice of reversing or vacating district court decisions finding noninfringement under the reverse doctrine of equivalents . . . in at least two instances . . .”).

152. 693 F. Supp. 814, 819 (N.D. Cal. 1988).

153. See, e.g., Amber Rose Stiles, Note, *Hacking Through the Thicket: A Proposed Patent Pooling Solution to the Nanotechnology “Building Block” Patent Thicket Problem*, 4 DREXEL L. REV. 555, 562 (2012); Stu Woolman, Elliott Fishman & Michael Fisher, *Evidence of Patent Thickets in Complex Biopharmaceutical Technologies*, 53 IDEA 1, 3 (2013); Amit Makker, Note, *The Nanotechnology Patent Thicket and the Path to Commercialization*, 84 S. CAL. L. REV. 1163, 1175–76 (2011).

154. Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 362–64 (2010).

155. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 112 (2009).

156. James E. Besson & Michael J. Meurer, *The Private Costs of Patent Litigation*, 9 J.L. ECON. & POL’Y 59, 62 (2012).

157. James E. Besson & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 408 (2014).

employees to testify at depositions, gather and produce documents, assist in developing and investigating defenses and design-arounds, and so forth.¹⁵⁸

Nor do these figures take into account the royalties paid to patent holders to avoid litigation or the sheer cost of triaging and dealing with licensing demand letters.¹⁵⁹ American companies are constantly beset with letters from patent holders demanding royalties on successful products:

Due to the increasing importance of patents and patent infringement litigation, it has become a fact of life for technology companies that they will receive multiple notice letters from patent-holders on a regular basis. In the current environment, a major task for in-house counsel in I.P. departments is to field these demand letters, make an assessment of which demand letters are frivolous or intended for harassment, and determine which raise valid infringement concerns. This work involves complicated investigations into the accused technology, the proper interpretation of the patent claims, and the existence of potentially invalidating prior art.¹⁶⁰

Nor is there compelling evidence that the licensing demands result in any additional innovation to benefit society.¹⁶¹ Rather, “most demands simply involve payment for the freedom to keep doing what the licensee was already doing.”¹⁶²

As set forth in the Constitution, the patent system is intended to be a quid pro quo—Congress is entitled to grant the patent monopoly in return for “Progress.”¹⁶³ Surely this Progress does not merely encompass the disclosure of abstract inventions that are never commercialized, but are instead used as litigation tools.¹⁶⁴ Rather, the Progress we should be demanding in exchange for the patent monopoly should be *innovations*—fully developed, market tested, successful machines and medicines that

158. *The Private Costs of Patent Litigation*, *supra* note 156, at 60.

159. *The Direct Costs from NPE Disputes*, *supra* note 157, at 402–03, 405.

160. J. Timothy B. Dyk & Samuel F. Ernst, *Patents*, in 9 BUSINESS & COMMERCIAL LITIGATION IN FEDERAL COURTS 775, 792 (Robert L. Haig ed., 4th ed. 2016).

161. Robin Feldman & Mark A. Lemley, *Do Patent Licensing Demands Mean Innovation?*, 101 IOWA L. REV. 137, 156–57 (2015).

162. *Id.*

163. U.S. CONST. art. I, § 8, cl. 1, 8 (“Congress shall have Power to . . . promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”).

164. See *The Direct Costs from NPE Disputes*, *supra* note 157, at 388 (discussing how the American patent system has experienced an explosion of litigation by nonpracticing entities—those who do not practice the technology of their patents despite owning and asserting them).

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can be used by the public.¹⁶⁵ Innovation is the result of far more than the specification of an abstract invention: It requires the development of a prototype, market testing, marketing, regulatory compliance, product distribution, product improvements, and many other activities.¹⁶⁶ Innovation is a “lengthy process” that is “fraught with uncertainty and great expense.”¹⁶⁷ The patent system should be designed to encourage this risky activity because it is innovation, not just invention, that benefits the public.¹⁶⁸ And yet, the current patent system acts as a tax on innovation.¹⁶⁹ The empirical evidence suggests “that it is far from clear that IP is doing the world more good than harm.”¹⁷⁰

This is not the first time in American history that we have seen a patent thicket threatening to deter innovation.¹⁷¹ Rather, in the 1800s, there was an explosion of patents covering railroad technology.¹⁷² Steven Usselman writes,

Throughout the antebellum period, railroading accounted for a disproportionate share of patents. Year after year, the list of new patents published in the annual report of the Commissioner of Patents contained increasing numbers of devices under the headings “Civil Engineering and Architecture” and “Land Conveyance.” Most of them pertained to railroads. In 1852, the Patent Office introduced a separate category for inventions devised specifically for railroading. By the end of the Civil War, the number of patents included in this classification had risen from fifty to over 500 per year. Because railroads operated complex facilities and performed a broad array of activities, moreover, they deployed numerous other technologies listed under categories ranging from paints, lubricants, and building materials to pumps, office machinery, and electrical equipment.¹⁷³

The result was a proliferation of patent litigation against the railroads, similar to what we see today with nonpracticing entities targeting technology companies.¹⁷⁴ Usselman continues, “as consumers of patented technologies railroads more frequently found themselves on the defensive. The mounting array of patents constituted an expanding

165. Ernst, *supra* note 58 at 7.

166. Cotropia, *supra* note 155, at 89–93.

167. Sichelman, *supra* note 154, at 347–48.

168. *Id.* at 366–68.

169. Mark A. Lemley, *Faith-Based Intellectual Property*, 62 UCLA L. REV. 1328, 1339 (2015).

170. *Id.* at 1335.

171. USSELMAN, *supra* note 17, at 101.

172. *Id.*

173. *Id.* at 99–100.

174. *See id.* at 101; *see also The Direct Costs from NPE Disputes*, *supra* note 157, at 388.

minefield of potential lawsuits and financial liabilities.”¹⁷⁵ Indeed, the patent litigation explosion of the 1800s was even bigger than the one we are experiencing today.¹⁷⁶ Christopher Beauchamp observes that in 1850, New York City and Philadelphia alone had ten times more patent litigation, per U.S. patent in force, than the entire United States in 2013.¹⁷⁷

The response to this patent thicket in the 1800s was twofold. First, as Beauchamp points out, there was a “shift of patent litigation from common law to equity[,]” such that “patent contests in court were almost all before judges, until jury proceedings returned in the 1980s and 1990s”¹⁷⁸ This shift to equity allowed for the rise of doctrines that allowed judges to weigh the equities of the patent holder against those of the accused infringer, rather than applying formalistic legal rules that only considered the rights of the patent holder, “patent misuse, inequitable conduct, and laches, as well as other essentially equitable judge-made contributions such as the doctrine of equivalents”¹⁷⁹ Hand-in-hand with this concept, patents were once seen as policy tools to encourage innovation for the good of society, not as absolute property rights to be enforced without regard to policy concerns.¹⁸⁰ Since the 1980s, however, we have embraced a system where patents are treated as largely unqualified property rights, the invasion of which results in legal remedies without regard to the equities of the parties or the good of innovation policy.

Rather than embracing prospective legislation to address the current patent litigation explosion, we might look to the lesson of history to free innovation from the patent thicket. Enter the reverse doctrine of equivalents. Like George Boyden’s air brake, the reverse doctrine of equivalents is the necessary pressure release valve in the patent system to ensure that radical innovations are preserved from the tangle of the patent thicket.¹⁸¹ The reverse doctrine of equivalents allows the judge in a patent case to investigate beyond the semantic game of literal infringement; to weigh the equities to determine if the accused innovation is substantially

175. USSELMAN, *supra* note 17, at 101.

176. Christopher Beauchamp, *The First Patent Litigation Explosion*, 125 YALE L.J. 848, 851 (2016); see Colleen V. Chien, *Reforming Software Patents*, 50 HOUS. L. REV. 325, 332–34 (2012) (describing how railroads found themselves under attack by patent speculators).

177. Beauchamp, *supra* note 176, at 851.

178. *Id.* at 912–13.

179. *Id.* at 913.

180. Herbert Hovenkamp, *The Emergence of Classical American Patent Law*, 58 ARIZ. L. REV. 263, 305–06 (2016).

181. See Robert Unikel & Douglas Eveleigh, *Protecting Inventors, Not Fortune Tellers: The Available Patent Protection for After-Developed Technologies*, 34 AIPLA Q.J. 81, 156 (2006).

superior to the claimed invention and has solved the problems in the prior art in a way that the patent holder failed to do.¹⁸² Because the reverse doctrine of equivalents as applied in *Westinghouse* involves a comparison of the success of the accused product to any commercial embodiment of the patented invention produced by the patentee,¹⁸³ the doctrine would be particularly effective against patent trolls, who do not practice their patents. Reviving the reverse doctrine of equivalents would be a patent reform that would not pose the danger of upsetting the innovation ecosystem in unpredictable ways, such as patent adherents argue that prospective legislation might do.¹⁸⁴ Instead, the reverse doctrine of equivalents can be applied on a case-by-case basis in a manner that does equity in each individual case.¹⁸⁵ The doctrine is a proven commodity.

In the last century, the reverse doctrine of equivalents preserved dozens of innovations for the benefit of the public—everything from train brakes to dot matrix printers.¹⁸⁶ The regular application of the reverse doctrine of equivalents did not appear to deter innovation, as this was a century that saw the development of the personal computer, the airplane, the automobile, the space rocket, the satellite, the submarine, antibiotics, and the internet, all without interference from (and perhaps with a little help from) the reverse doctrine of equivalents. It is time to unleash the power of the reverse doctrine of equivalents once again.

CONCLUSION

The Federal Circuit has done the public a disservice by relegating the reverse doctrine of equivalents to an “anachronistic exception.” The reverse doctrine of equivalents is the necessary counterpart to the doctrine of equivalents, ensuring that the weighty question of patent infringement is not reduced to a mere word game. We must not allow the case of

182. *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1898) (quoting *Burr v. Duryee*, 68 U.S. 531, 572–73 (1864)).

183. *Westinghouse*, 170 U.S. at 572 (“We are induced to look with more favor upon this [accused] 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.”).

184. See, e.g., Press Release, Biotechnology Indus. Org., BIO Opposes H.R. 9, The Innovation Act (June 11, 2015), <https://www.bio.org/media/press-release/bio-opposes-hr-9-innovation-act>.

185. See Chien, *supra* note 176, at 347–48 (arguing that broad, substantive legislative proposals across the patent system did not solve the railroad patent thicket; rather, tailored reforms in the courts and self-help were most effective).

186. *Westinghouse*, 170 U.S. at 545 (involving train brakes); *Mead*, 723 F.2d at 455 (involving printers).

Westinghouse v. Boyden to become forgotten precedent because the rule announced in that case is an important check on the patent system that allows for the liberation from the patent thicket of important innovations. The day must surely come when a brave petitioner for certiorari awakens the Supreme Court from its slumber and points out that the Federal Circuit has all but overruled critical Supreme Court precedent.