

THE RISE AND FALL OF THE FIRST AMERICAN PATENT THICKET: THE SEWING MACHINE WAR OF THE 1850S

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When Michael Heller proposed that excessively fragmented property rights in land can frustrate its commercial development, patent scholars began debating whether Heller's anticommons theory applies to property rights in inventions. Do "patent thickets" exist? The rise and fall of the first American patent thicket—the Sewing Machine War of the 1850s—confirms that patent thickets do exist and that they can frustrate commercial development of new products. But this historical patent thicket also challenges the widely held assumption that this is a modern problem arising from allegedly new issues in the patent system, such as incremental high-tech innovation and the impact of "patent trolls." The Sewing Machine War exhibited all of these phenomena, proving that these are hoary issues in patent law. The denouement of this patent thicket in the Sewing Machine Combination of 1856, the first privately formed patent pool, further challenges the conventional wisdom that patent thickets are best solved through public-ordering regimes that limit property rights in patents. The invention and incredible commercial success of the sewing machine is a striking account of early American technological, commercial, and legal ingenuity, which heralds important empirical lessons for how patent thicket theory is understood and applied today.

* Professor of Law, George Mason University School of Law. For helpful comments, thank you to William Adkinson, Robert Brauneis, Eric Claeys, Tom Hazlett, Mark Janis, Bruce Johnson, Scott Kominers, Mark Lemley, Clarisa Long, Suzanne Majewski, Randall Marks, Frances Marshall, Mark Schultz, Henry Smith, John Visser, Joshua Wright, Timothy Wu, and participants in the Intellectual Property Colloquium at Columbia University Law School, the DOJ/FTC/PTO Seminar Series, the Levy Workshop on Law and Liberty at George Mason University School of Law, the History of Intellectual Property Seminar at George Washington University School of Law, the Works-in-Progress in Intellectual Property Colloquium at Tulane University School of Law, a faculty workshop at William & Mary School of Law, and the Washington, D.C. Legal History Roundtable. Comments at *The Volokh Conspiracy* were also very useful, and thank you to Eugene Volokh for inviting me to guest blog an early draft of my Article. Lastly, this Article was made possible by a stipend from the Law & Economics Center at George Mason University School of Law, and by invaluable research materials provided by the Law Library at the Michigan State University College of Law.

INTRODUCTION

The Sewing Machine Combination was the commercial trust that was responsible for the mass production of the sewing machine in the nineteenth century—a commodity that was fundamental to the success of the Industrial Revolution in America.¹ The Sewing Machine Combination was also the first patent pool in American history,² operating successfully from its formation in 1856 until its last patent expired in 1877.³ As such, the Sewing Machine Combination has been a topic of study by some historians, but the provenance of this important patent pool has long been forgotten. One finds only scattered references to the inception of the Sewing Machine Combination in what contemporaneous newspapers called the “Sewing Machine War.”⁴ Yet the details of this conflict among the early sewing machine manufacturers and patentees—how this war was started, who was involved, and what was so extraordinary about the commercial and legal conflicts that it deserved the rather histrionic title of a “war”—are sketched in only the most generalized terms by legal scholars today.⁵

Today, scholars would refer to this conflict with less rhetorical flourish, identifying it simply as a patent thicket in sewing machines.⁶ A “patent thicket” exists when too many patents covering individual elements of a commercial

1. See RUTH BRANDON, *A CAPITALIST ROMANCE* 100–10 (1977) (describing, among other things, how sewing machines were the first non-firearm consumer products that used interchangeable, machine-tooled parts). Brandon also notes that the Singer sewing machine company became “the first . . . American-based multinational corporation. As early as 1861, Singer & Co. was selling more sewing machines in Europe than in the United States.” *Id.* at 135. Another commentator writes that “the sewing machine industry—particularly the Singer Manufacturing Company—pointed the way to innovation in mass production.” DAVID A. HOUNSHELL, *FROM THE AMERICAN SYSTEM TO MASS PRODUCTION 1800–1932*, at 122 (1984). The Elizabethport Factory of the Singer Manufacturing Company, for example, “was reported to be the largest factory in the United States making a single product under one roof” in the nineteenth century. *Id.* at 95 fig.2.15.

2. See WILLIAM EWERS & H.W. BAYLOR, *SINCERE’S HISTORY OF THE SEWING MACHINE* 39 (1970) (stating that the sewing machine patent owners “formed the first patent pool in United States history, called the ‘Combination’”); FLOYD L. VAUGHAN, *THE UNITED STATES PATENT SYSTEM: LEGAL AND ECONOMIC CONFLICTS IN AMERICAN PATENT HISTORY* 40 (1956) (“The first patent pool among manufacturers apparently was that of sewing machine patents in 1856.”).

3. VAUGHAN, *supra* note 2, at 41.

4. DON BISSELL, *THE FIRST CONGLOMERATE: 145 YEARS OF THE SINGER SEWING MACHINE COMPANY* 84 (1999) (referring to the “famous ‘Sewing Machine War,’ which regularly carried the day’s headlines”); HAROLD EVANS, *THEY MADE AMERICA* 90 (2004) (discussing “what the sensational new newspapers liked to call the Sewing Machine War, one of mutual insults in advertisements and news stories, and endless lawsuits”).

5. See, e.g., Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 *IND. L. REV.* 351, 386–87 (2007).

6. JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE* 80 (2008) (identifying patent pools as responses to patent thickets, and observing that “the first patent pool was formed for sewing machines in 1856 after extensive litigation”); MICHAEL A. HELLER, *THE GRIDLOCK ECONOMY: HOW TOO MUCH OWNERSHIP WRECKS MARKETS, STOPS INNOVATION, AND COSTS LIVES* 31 (2008) (“Patent thickets have threatened to strangle emerging industries ranging from sewing machines to computers.”).

product are separately owned by different entities.⁷ This concept is not unique to patent law; it is based on Professor Michael Heller's theory of the anticommons in real property, which arises when there is excessive fragmentation of ownership interests in a single parcel of land.⁸ According to economic theory, the problem of such excessive fragmentation of ownership interests is straightforward: it increases transaction costs, accentuates hold-out problems, and precipitates costly litigation, which prevents commercial development of the affected property.⁹ Additionally, a patent thicket can block new research into follow-on inventions,¹⁰ preventing the "Progress of . . . the useful Arts."¹¹ There is now a debate raging in the literature as to whether patent thickets in fact lead to such problems,¹² and vivid anecdotes abound about obstructed development of new drugs¹³ or problems in distributing life-enhancing genetically engineered foods to the developing world.¹⁴

Given this heightened interest among scholars and lawyers concerning the existence and policy significance of patent thickets, a historical analysis of the first

7. Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard-Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119–26 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2001) (identifying a patent thicket as "a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology").

8. See generally Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998).

9. See Shapiro, *supra* note 7, at 119–26.

10. See, e.g., Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698, 698 (1998) ("Patents and other forms of intellectual property protection . . . can go astray when too many owners hold rights in previous discoveries that constitute obstacles to further research.").

11. See U.S. CONST. art. I, § 8, cl. 8.

12. Compare, e.g., David E. Adelman & Kathryn L. DeAngelis, *Patent Metrics: The Mismeasure of Innovation in the Biotech Patent Debate*, 85 TEX. L. REV. 1677, 1679–82 (2007) (providing empirical study that concludes that there is no patent thicket in biotech), with James Bessen, *Patent Thickets: Strategic Patenting of Complex Technologies* 1–4 (Research on Innovation Working Paper, 2003), available at <http://www.researchoninnovation.org/thicket.pdf> (providing empirical study "that patent thickets can reduce R&D incentives even when there are no transaction costs, holdup or vertical monopoly problems").

13. See HELLER, *supra* note 6, at 4–5 (recounting story of an unnamed executive at an unidentified pharmaceutical company who claims that a "promising treatment for Alzheimer's" is blocked by a patent thicket).

14. See Andrew Pollack, *The Green Revolution Yields to the Bottom Line*, N.Y. TIMES, May 15, 2001, at F1 ("Scientists at the University of Costa Rica, for example, have genetically engineered rice to provide resistance to a virus that is a major problem in the tropics. But before the university can sell the seeds to farmers, it must get clearance from holders of as many as 34 patents . . ."); Sabrina Safrin, *Chain Reaction: How Property Begets Property*, 82 NOTRE DAME L. REV. 1917, 1961 (2007) ("[T]he scientists who created the celebrated 'golden rice' (a strain of rice genetically engineered for enhanced vitamin A) may have infringed as many as seventy patents. However, the scientists who created the rice, which might prevent thousands of cases of blindness a year, report that they could not have created the rice had they attempted to identify and secure the consent of all implicated patent holders in the process.").

patent thicket and its resolution in the first patent pool is important. This Article thus combines secondary sources with newly discovered primary sources to retell the story of the invention of the sewing machine in the antebellum era, the rise of the Sewing Machine War in the 1850s, and the denouement of this patent thicket in the Sewing Machine Combination of 1856. The historical material will be of interest to legal historians, who have long neglected this significant event in the mid-nineteenth century. Even more important, this new perspective on this episode in antebellum patent law—the explicit identification of the Sewing Machine War as a patent thicket—will be of significant interest to patent and property scholars today.

In modern patent and property theory, this historical study fills a gap in the scholarship on patent thickets in at least two ways. On one hand, it serves as an empirical case study of a patent thicket that (temporarily) prevented the commercial development of an important product of the Industrial Revolution. There can be no doubt that the Sewing Machine War was a patent thicket. As one historian has observed: “The great advantage of the sewing machine, from *the lawyers’ point of view*, was that . . . no one complete and entire working sewing machine was ever invented by one person unaided.”¹⁵ The sewing machine was the result of numerous incremental and complementary inventive contributions, which led to a morass of patent infringement litigation given overlapping patent claims to the final commercial product. This is important, because, as Professor Heller has observed, “[a]nticommons theory is now well established, but empirical studies have yet to catch up.”¹⁶ The Sewing Machine War confirms that patent thickets exist, and that they can lead to what Professor Heller has identified as the tragedy of the anticommons.¹⁷

On the other hand, the story of the sewing machine challenges some underlying assumptions in the current discourse about patent thickets. One assumption is that patent thickets are primarily a modern problem arising from recent changes in technology and law. Professor Heller explicitly makes this point in *The Gridlock Economy*:

There has been an unnoticed revolution in how we create wealth. In the old economy—ten or twenty years ago—you invented a product and got a patent . . . Today, the leading edge of wealth creation requires assembly. From drugs to telecom, software to semiconductors, anything high tech demands assembly of innumerable patents.¹⁸

In fact, Professor Heller’s first foray into patent thicket theory was assessing a potential anticommons in “biomedical research” that he and his co-author, Professor Rebecca Eisenberg, predicted would occur given extensive patenting of biotech research tools (a prediction that has not yet been borne out).¹⁹

15. BRANDON, *supra* note 1, at 95–96 (emphasis added).

16. HELLER, *supra* note 6, at 44.

17. *See id.* at 37.

18. *Id.* at xiv.

19. *See generally* Heller & Eisenberg, *supra* note 10. For a critical assessment of their 1998 prediction, see Adelman & DeAngelis, *supra* note 12, at 1679–82 (concluding

Continuing this focus on biotech, *The Gridlock Economy* discusses biotech research and development almost exclusively in its analysis of anticommons theory in patent law.²⁰ Despite some off-hand references to earlier patent thickets, such as a thicket in the first airplane patents that was resolved through Congress's enactment of a "compulsory patent pool" in 1917,²¹ the focus of the theoretical and empirical studies of patent thickets is on very recent inventions in high-technology and science—computers, telecommunications, and biotech.²²

A second assumption is that patent thickets are a property problem—too much property that is too easily acquired that results in too much control—and so they are best addressed by limiting the property rights secured to patentees.²³ As Professor Heller euphemistically puts it, "Cutting-edge technology can be rescued from gridlock by creatively adapting property rights."²⁴ More specific proposals have called for limiting conveyance rights in patented drugs,²⁵ authorizing federal agencies to terminate patent rights to avoid patent thickets,²⁶ and "excluding patentability of genetic inventions for reasons of morality or public order."²⁷ Many scholars concerned about patent thickets hail the U.S. Supreme Court's recent decision in *eBay Inc. v. MercExchange, L.L.C.*,²⁸ because the Court made it more difficult for patentees to become hold-outs through threatening or obtaining

from a 2007 survey of the biotech industry that it is healthy and viable because ownership of patents is diffuse, patent applications are rising, and new firms continue to enter the market unabated).

20. HELLER, *supra* note 6, at 49–78.

21. *See id.* at 30–31.

22. *See* ADAM B. JAFFE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS* 56–77 (2004); Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1625–27 (2003); David S. Evans & Anne Layne-Farrar, *Software Patents and Open Source: The Battle over Intellectual Property Rights*, 9 VA. J.L. & TECH. 10, 21–23 (2004); Stephen R. Munzer, *Commons, Anticommons, and Community in Biotechnological Assets*, 10 THEORETICAL INQUIRIES L. 271, 272–76 (2009); Arti K. Rai, *The Information Revolution Reaches Pharmaceuticals: Balancing Innovation Incentives, Cost, and Access in the Post-Genomics Era*, 2001 U. ILL. L. REV. 173, 192–94; *see also supra* notes 9–10, 14 and accompanying text; *infra* notes 25–26 and accompanying text.

23. *See, e.g.*, Bessen, *supra* note 12, at 1 ("Recent commentators suggest that lower patenting standards encourage patent thickets, creating difficulties for innovators." (internal citations omitted)); Shapiro, *supra* note 7, at 144 (observing that "creating significant transactions costs for those seeking to commercialize new technology based on multiple patents, overlapping rights, and hold-up problems" plague innovation today, and thus noting that "it is fair to ask whether the pendulum has swung too far in the direction of strong patent rights").

24. HELLER, *supra* note 6, at 30.

25. *See* Richard A. Epstein & Bruce N. Kuhlik, *Is There a Biomedical Anticommons?*, 27 REGULATION 54, 56–58 (2004) (discussing legislative efforts "to treat the blockade problem" through price controls on pharmaceutical and biotech patents).

26. *See* Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dohi Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289, 293–95 (2003).

27. ORG. FOR ECON. CO-OPERATION & DEV., *GENETIC INVENTIONS, INTELLECTUAL PROPERTY RIGHTS AND LICENSING PRACTICES: EVIDENCE AND POLICIES* 75 (2002), available at <http://www.oecd.org/dataoecd/42/21/2491084.pdf>.

28. 547 U.S. 388 (2006).

injunctions.²⁹ Although Professor Heller, the Founding Father of anticommons theory, acknowledges that “the empirical studies that would prove—or disprove—our theory remain inconclusive,”³⁰ this has not stopped the numerous proposals of various regulatory or statutory measures to redefine and limit property rights in patents.

The story of the invention and development of the sewing machine challenges these two assumptions insofar as it is a story of a patent thicket in an extremely old technology, but, more important, it is a story of the successful resolution of this thicket through a private-ordering mechanism. The Sewing Machine War was not brought to an end by new federal laws, lawsuits by public interest organizations, or new regulations at the Patent Office, but rather by the patent owners exercising their rights of use and disposition in their property.³¹ In so doing, they created the Sewing Machine Combination, which successfully coordinated their overlapping property claims until its last patent expired in 1877. Moreover, the Sewing Machine War is a salient case study because this mid-nineteenth-century patent thicket also included many related issues that are often intertwined today with concerns about modern patent thickets, such as a non-practicing entity (i.e., a “patent troll”) suing infringers after his demands for royalty payments were rejected, massive litigation between multiple parties and in multiple venues, costly prior art searches, and even a hard-fought priority battle over who was the first inventor of the lockstitch.

In this respect, the existence and tremendous commercial success of the Sewing Machine Combination of 1856—a private-ordering solution to the Sewing Machine War—suggests that the current discourse on patent thickets is empirically impoverished. The Sewing Machine Combination reveals how patent owners have substantial incentives to overcome a patent thicket without prompting by federal officials or judges, and that they can in fact do so through preexisting private-ordering mechanisms, such as contract and corporate law. Heller, to his credit, recognizes that there are “market-driven solutions” to patent thickets,³² but his writing reveals a deep skepticism about such solutions vis-à-vis his more favorably considered “regulatory solutions.”³³ The Sewing Machine Combination is an example of how patent owners can rescue themselves from commercial gridlock, which unleashed an explosion in productivity and innovation in a product that was central to the success of the Industrial Revolution in nineteenth-century America.

29. See, e.g., David B. Conrad, *Mining the Patent Thicket: The Supreme Court's Rejection of the Automatic Injunction Rule in eBay v. MercExchange*, 26 REV. LITIG. 119, 131–32 (2007); Gavin D. George, *What is Hiding in the Bushes? eBay's Effect on Holdout Behavior in Patent Thickets*, 13 MICH. TELECOMM. & TECH. L. REV. 557, 566–69 (2007).

30. HELLER, *supra* note 6, at 77.

31. See Adam Mossoff, *A Simple Conveyance Rule for Complex Innovation*, 44 TULSA L. REV. 707, 711–17 (2009) (summarizing nineteenth-century patent doctrines that supported patentees in freely exercising their use and disposition rights).

32. HELLER, *supra* note 6, at 69–75.

33. *Id.* at 75–76.

I. THE INCREMENTAL INVENTION OF THE SEWING MACHINE

Today, some people might think that the sewing machine is anything but a complex invention. In our high-tech world in which pharmaceutical companies now design and construct therapeutic drugs from the protein up,³⁴ or Apple makes it possible to check email, update one's calendar, surf the web, and talk on the phone all in one portable device (the iPhone), a sewing machine might seem downright mundane. This attitude is reinforced by the fact that few young people today may have even used a sewing machine. Yet a sewing machine is actually an intricate piece of technology, and in the nineteenth century, it was the equivalent of today's new blockbuster drug or high-tech device.

Part of the problem in recognizing this basic truth about the sewing machine is that a cultural myth has arisen concerning its invention. Depending on whom you ask, you will hear that the sewing machine was invented by Elias Howe³⁵ or Isaac Merritt Singer.³⁶ Of course, both men played a central role in the invention and commercial development of the sewing machine in the late 1840s and early 1850s, but they were very much Johnny-come-latelies to the story. Their respective contributions brought the sewing machine to the apex of its invention as a practical and commercially viable product, which is perhaps why the public remembers only their names. However, the invention of the sewing machine was not the creation of any single person, unlike many other antebellum-era inventions,

34. In the early 1990s, Vertex Pharmaceuticals was the first commercially successful biotech company that rejected the traditional screening process that was the modern pharmaceutical industry's primary method for developing new drugs. The screening process consisted of screening soil samples obtained from the environment, testing the samples against specific diseases or physical conditions, discovering the specific molecule of the thousands or millions in the sample that is active against the targeted condition, solving the structure of the molecule, and then discovering an economically feasible way to manufacture the molecule. See BARRY WERTH, *THE BILLION-DOLLAR MOLECULE* 29–32 (1994) (describing screening methodology). This shot-in-the-dark testing, according to Dr. Joshua Boger, founder and CEO of Vertex Pharmaceuticals, “rarely works” and is “a very frustrating process because you can’t do anything about it” when it fails. *Id.* at 186. Thus, Vertex Pharmaceuticals instead pursued a new structure-based design process in which drugs are literally built from the protein up. *Id.*

35. See *Schoolhouse Rock: Mother Necessity* (ABC television broadcast 1977).

36. Mahatma Gandhi, for instance, believed that Singer invented the sewing machine: “Today machinery merely helps a few to ride on the backs of millions. . . . I would make intelligent exceptions. Take the case of the Singer Sewing Machine. . . . [T]here is a romance about the device itself. Singer saw his wife labouring over the tedious process of sewing and seaming with her own hands, and simply out of his love for her he devised the sewing machine, in order to save her from unnecessary labour.” Mahadev Desai, *A Morning with Gandhiji*, in 6 *YOUNG INDIA* 377, 378 (M.K. Gandhi ed., 1924). This story is a myth in many respects, including Singer's desire to alleviate his wife's labor. Singer at first demurred to his business associates' request to tinker with the sewing machine that they had in their shop, proclaiming, “What a devilish machine! You want to do away with the only thing that keeps women quiet, their sewing!” EVANS, *supra* note 4, at 88.

such as Charles Goodyear's invention of vulcanized rubber in 1839³⁷ or Samuel Morse's "flash of genius" in conceiving of the telegraph machine in 1832.³⁸

Given the basic human need for clothing, sewing has long been a skill valued by modern humans. Unfortunately, hand-sewing for long hours is extremely tedious and physically taxing, especially when clothing is demanded in mass quantities, as it was by the eighteenth and early nineteenth centuries. In *Das Kapital*, Karl Marx recounted the story of a milliner who literally worked herself to death as an illustration of the "vampire-like" nature of capitalists.³⁹ In 1853, the *New York Herald* opined about the working conditions of seamstresses: "We know of no class of workwomen who are more poorly paid for their work or who suffer more privation and hardship."⁴⁰ In antebellum America, Thomas Hood's *Song of the Shirt* was popular because it lamented the well-known working conditions of seamstresses.⁴¹ The hand-sewing trade and its workers would benefit tremendously from mechanization. As one historian remarked, "Looked at in the abstract, in terms purely of ideas and markets, the sewing machine could not fail."⁴²

Yet efforts to create a sewing machine for almost a century did repeatedly fail. A review of the historical sources reveals that the difficulties that plagued the invention of the sewing machine were essentially two-fold. One was mechanical, and the other was conceptual, but these two issues were interrelated.⁴³ With respect to the mechanical issue, the invention of a practical and commercially successful sewing machine comprised ten complementary elements. These ten elements were first explicitly identified by Andrew Jack in an oft-cited 1957 article: (1) the

37. See CHARLES SLACK, NOBLE OBSESSION: CHARLES GOODYEAR, THOMAS HANCOCK, AND THE RACE TO UNLOCK THE GREATEST INDUSTRIAL SECRET OF THE NINETEENTH CENTURY 83–90 (2002).

38. EVANS, *supra* note 4, at 71 (writing that Morse claimed to have conceived of the telegraph in what he described as a "flash of genius" during an ocean voyage between Europe and America).

39. See 1 KARL MARX, CAPITAL 239–41, 243 (Frederick Engels ed., Samuel Moore & Edward Aveling trans., 1939) (3d ed. 1867) (recounting the death of Mary Anne Walkley, who officially died of apoplexy "accelerated by overwork").

40. BRANDON, *supra* note 1, at 67.

41. *Id.* at 67–68. The *Song of the Shirt* lyrics are as follows:

With fingers weary and worn,
 With eyelids heavy and red,
 A woman sat, in unwomanly rags,
 Plying her needle and thread,
 Stitch! Stitch! Stitch!
 In poverty, hunger and dirt;
 And still with a voice of dolorous pitch—
 Would that its tone could reach the rich!—
 She sang this "Song of the Shirt!"

Id. at 68.

42. *Id.* at 67 (emphasis omitted).

43. See EVANS, *supra* note 4, at 86 ("For sewing to be *mechanized* it was necessary to break away from trying to replicate the nimble fingers of the seamstress, to remove all memory traces of hand-sewing and think *conceptually* of the desired end." (emphasis added)).

sewing of a lockstitch,⁴⁴ (2) the use of an eye-pointed needle, (3) a shuttle carrying a second thread, (4) a continuous source of thread (spools), (5) a horizontal table, (6) an arm overhanging the table that contained a vertically positioned eye-pointed needle, (7) a continuous feed of the cloth (synchronized with the needle motion), (8) tension controls for the thread that give slack as needed, (9) a presser foot to hold the cloth in place with each stitch, and (10) the ability to sew in either straight or curved lines.⁴⁵ The first sewing machine to incorporate all ten of these elements was the famous Singer Sewing Machine, which was first sold to the public in the fall of 1850.⁴⁶ But Singer was neither the first person to invent all ten elements nor was he the first to patent them.

Each of these elements were invented and patented over the course of many decades, beginning in Europe in the mid-eighteenth century. Given the omnipresent need for clothing and the conditions of its production, it is perhaps unsurprising that the quest for a machine to do the work of hand-sewing began with the first steps of the Industrial Revolution. In fact, there was a tremendous amount of inventive activity concerning the second element in Andrews's list: the eye-pointed needle. This was first invented by a German mechanic, Charles F. Weisenthal, who obtained a British patent for it in 1755.⁴⁷ Weisenthal, however, did not develop his invention into a marketable product. In 1807, Edward Walter Chapman received another British patent for a banding machine that used an eye-pointed needle, but his patent was limited to only banding or belting, and thus he appears to not have seen the potential of a sewing machine in his invention.⁴⁸ The eye-pointed needle appeared again around 1810, when Balthasar Krems, a hosiery maker in Mayen, Germany, began using this type of needle in a sewing machine. Unfortunately, he did not patent or commercialize his invention, and, according to one historian, the invention "died with the inventor in 1813."⁴⁹ A year after Krems died, Josef Madersperger, a tailor in Vienna, Austria, sought to invent a sewing machine for the purpose of producing embroidery, and in 1839, he invented a machine that used both a thread carried in an eye-pointed needle and a second thread to create a lockstitch (Bradshaw's first element).⁵⁰ Madersperger received Austrian patents for his invention, but his machines were impractical, and thus they failed as commercial products. He died in penury in 1850. Lastly, in 1841, two other British inventors, Edward Newton and Thomas Archbold, received a British patent for a tambouring machine that used an eye-pointed needle for

44. A lockstitch is a type of sewing technique that "involves using two spools of thread, one above the fabric, one below, with a shuttle to push the lower thread through the loop made by the upper [thread] as it is pushed through the fabric by an eye-pointed needle. The needle with the upper thread then retracts, and the shuttle returns to await the next stitch." BRANDON, *supra* note 1, at 58.

45. See Andrew B. Jack, *The Channels of Distribution for an Innovation: The Sewing-Machine Industry in America, 1860–1865*, 9 EXPLORATIONS ENTREPRENEURIAL HIST. 113, 114 (1957).

46. See *infra* notes 101–110, 121 and accompanying text.

47. See GRACE ROGERS COOPER, *THE SEWING MACHINE: ITS INVENTION AND DEVELOPMENT* 4 (2d ed. 1976).

48. See *id.* at 7.

49. *Id.* at 7–8.

50. *Id.* at 8–9.

stitching ornamental designs on gloves, but they neither intended nor used their machine and its eye-pointed needle for the general purpose of sewing.⁵¹

The fundamental problem with these many independent inventions of the eye-pointed needle was primarily conceptual, not mechanical. The early efforts at using machines for sewing attempted to replicate the motions of the human hand in sewing fabric, i.e., driving a needle with a thread through a piece of fabric and then pulling the same needle back through to the other side of the fabric. In 1804, for instance, Thomas Stone and James Henderson received a French patent for a sewing machine that replicated hand-sewing motions by using mechanical pincers. Unsurprisingly, their machine was unsuccessful and saw only “some limited use.”⁵² As with the invention of the typewriter in the late nineteenth century, sewing-machine inventors needed to make a conceptual break between human-hand motion and mechanical motion.⁵³

This pivotal conceptual innovation was first made by a French tailor, Barthelemy Thimonnier, who invented an industrial-size sewing machine in 1830 that contained many of Bradshaw’s ten elements of a successful sewing machine, such as a horizontal table and an overhanging arm containing a needle. In fact, Thimonnier is widely recognized as the first person to use a sewing machine for commercial profit; by 1841, he had eighty machines operating in his Paris shop stitching French army uniforms.⁵⁴ But Thimonnier had an unfortunate birthright, and his shop was destroyed by a mob of French luddites. He later expressed “surprise[] . . . at the amount of vilification his machine was attracting.”⁵⁵ Unable to overcome the vociferous political and economic opposition to his invention, Thimonnier died poor without realizing any financial gain from his invention.⁵⁶ Two British inventors, John Fisher and James Gibbons, also made this important conceptual leap in 1844, but they saw their machine, which used an eye-pointed needle carrying one thread and a shuttle carrying another thread, as a way to produce only lace on fabric.⁵⁷ Fisher “readily admitted at a later date that he had not the slightest idea of producing a sewing machine, in the utilitarian meaning of the term.”⁵⁸

Despite these Old World efforts at inventing a sewing machine, it was a series of American inventors, working in the 1840s and 1850s, who succeeded in

51. *Id.* at 13 (noting that they “never contemplated [their invention] as a sewing machine”).

52. *Id.* at 6.

53. Similarly, an American inventor, John J. Greenough, received the first American patent in 1842 on a sewing machine that used a two-pointed needle with an eye in the middle and mechanical pincers to hold the cloth, but no machines other than the model he filed with the Patent Office were ever built. *Id.* at 13.

54. *Id.* at 11.

55. BRANDON, *supra* note 1, at 57.

56. Some commentators have identified Thimonnier’s failure as resulting from a cultural norm in France that disapproved of property rights in inventions. *See* WILLIAM ROSEN, *THE MOST POWERFUL IDEA IN THE WORLD* 267–69 (2010).

57. COOPER, *supra* note 47, at 15 & n.31 (“This is the earliest known patent using the combination of an eye-pointed needle and a shuttle to form a stitch.”).

58. *Id.* at 16.

threading the needle in creating the first practical sewing machine.⁵⁹ Confirming Alexis de Tocqueville's observation that "the Americans always display a clear, free, original, and inventive power of mind,"⁶⁰ American tradesmen and machinists recognized that a practical and successful sewing machine could not simply replicate the motion of human hands. With this pragmatic approach to science and technology,⁶¹ antebellum Americans easily made the conceptual leap from hand-motion to machine-motion and thus proceeded to invent (and reinvent) the necessary elements that constituted the first practical sewing machine.

Beginning in the early 1840s, several American inventors received patents on sewing machines or sewing machine components, including George H. Corliss (who later achieved fame with his inventive contribution to the steam engine⁶²), but these turned out to be of little significance.⁶³ It was not until 1843 that Elias Howe, Jr. invented his version of the sewing machine, which was then followed by a series of independent inventions and follow-on improvement inventions that ultimately produced the first fully functional and successful sewing machine in 1850. Howe is also personally responsible for launching the Sewing Machine War a few years later, which is a fitting symmetry that secures for him a foundational role in sewing machine history.

Impoverished and suffering ill health for much of his life, Howe was working as an apprentice of little consequence in a machine shop in Boston in 1839 when he overheard an inventor and a businessman talking about how a sewing machine could not be made. As later recounted by Howe, the inventor asked, "Why don't you make a sewing machine?" 'I wish I could,' said the capitalist; 'But it can't be done.'"⁶⁴ The "capitalist" then told the inventor that, if he could invent a sewing machine, "I'll insure you an independent fortune."⁶⁵ Although he had received no formal schooling in natural philosophy or mechanics (a common trait of most American inventors of the day⁶⁶), Howe was impressed by

59. *Id.* at 19.

60. ALEXIS DE TOCQUEVILLE, *DEMOCRACY IN AMERICA* 460 (J.P. Mayer ed., George Lawrence trans., 1969) (1840).

61. *Id.* (noting how "the purely practical side of science is cultivated admirably" in America).

62. *See* DAVID McCULLOUGH, *THE GREAT BRIDGE* 329, 351–52 (1972) (describing how Corliss directed President Ulysses S. Grant and Brazilian Emperor Dom Pedro to turn on his steam engine at the 1876 World Fair, leading a newspaper reporter to observe that "perhaps for the first time in the history of mankind, two of the greatest rulers in the world obeyed the order of an inventor citizen"); ROSEN, *supra* note 56, at 312–13 (noting how Corliss's 1849 patented steam engine "resulted in a massive increase in efficiency and some extraordinarily massive engines").

63. In addition to Corliss, who claimed that it was his work on the sewing machine that was a proximate cause for his invention of the steam engine, there was John J. Greenough (patent no. 2466, issued Feb. 21, 1842), Benjamin W. Bean (patent no. 2982, issued Mar. 4, 1843), and James Rodgers (patent no. 3672, issued July 22, 1844). *See* COOPER, *supra* note 47, at 13–15.

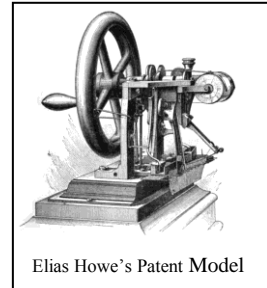
64. BRANDON, *supra* note 1, at 60.

65. *Id.*

66. In the antebellum era, it seems that many of the path-breaking inventions came from people with no formal training in science or technology and who were often

this remark and he began thinking of the problems entailed in creating a sewing machine.

In 1843, he began working on the invention in earnest, hoping to become as wealthy as the capitalist had promised. By the fall of that year, he at last invented a sewing machine, although it would take a few more years of tinkering to improve its performance and to confirm its functionality. A few years later, he filed for a patent, which issued on September 10, 1846, claiming the use of an eye-pointed needle in combination with a second thread carried by a shuttle to create a lockstitch.⁶⁷ The *Scientific American* promptly published the patent claims on September 26, 1846, under the heading “New Inventions.”⁶⁸ Howe’s three elements formed the core of the Singer Sewing Machine that would eventually sweep the United States in the 1850s.



Elias Howe’s Patent Model

Howe’s sewing machine, of which the patent model “is acknowledged to be one of the most beautiful ever presented to the Patent Office,”⁶⁹ was a feat of engineering. It sewed 250 stitches per minute—seven times faster than sewing by hand.⁷⁰ Yet firms and the buying public had been disappointed too often by earlier inventors claiming to have solved the sewing machine problem; thus Howe’s attempts at commercializing his invention were met with a resounding defeat by a skeptical business world and wary consumers.⁷¹

working outside of the field in which they came up with their invention. For instance, Samuel Morse was an artist at the time he invented the telegraph, Charles Goodyear had no schooling at all before he invented vulcanized rubber, Eli Whitney was trained as a lawyer when he invented the mechanized cotton gin, Samuel Colt was a self-schooled tradesman when he invented the revolver. See generally EVANS, *supra* note 4, at 16–135 (discussing the backgrounds and contributions of various American innovators). In addition to Howe’s and others’ contributions to the sewing machine, one of the important inventors was a farmer, James E.A. Gibbs, whose only inventive work was on the sewing machine. He made his first sewing machine after seeing a woodcut drawing of a Grover & Baker sewing machine, and he then proceeded to invent novel features of the device working on his farm by himself using only his own materials and his commonsense intuitions. See COOPER, *supra* note 47, at 45–47.

67. U.S. Patent No. 4750 (issued Sept. 10, 1846). The drawing of the patent model is from Wikimedia Commons, available at http://en.wikipedia.org/wiki/File:Elias_Howe_sewing_machine.png (last visited Jan. 27, 2011).

68. See *New Inventions*, 2 SCI. AM. 4, 4 (1846).

69. BRANDON, *supra* note 1, at 64.

70. JAMES PARTON, HISTORY OF THE SEWING MACHINE 8 (1872). This was a republication of an article that appeared in the May 1867 issue of the *Atlantic Monthly*.

71. See *The Story of the Sewing-Machine. Its Invention—Improvements—Social, Industrial and Commercial Importance*, N.Y. TIMES, Jan. 7, 1860, at 2 (“For years he struggled . . . in trying to convince the public of its utility. . . . The incredulous public were slow to understand and appreciate its merits.”). Such problems are not unusual for pioneering inventors. Charles Goodyear toiled for years after his invention of vulcanized rubber in 1839 to convince American firms of the value of his invention, but they had

They were not entirely wrongheaded in rejecting Howe's sewing machine, as it did have some faults, some of which were described in a subsequent patent issued to John Bradshaw in 1848.⁷² For instance, Howe's sewing machine worked in a vertical position with its eye-pointed needle moving horizontally, and this did not make it easy to feed the cloth through the machine. Also, its eye-pointed needle was curved, and thus it was brittle and often broke.⁷³ Lastly, the mechanism for feeding the cloth through the vertically placed sewing machine, called a "baster plate," made it impossible to either sew in a single continuous motion or to sew curved seams.⁷⁴ Howe's invention was pivotal in terms of his combination of three elements—an eye-pointed needle, a shuttle, and the creation of a lockstitch—but it was not yet a fully practical sewing machine. In October 1846, Howe set off for England to try to convince British tailors of the importance of his invention, and he would not return to the United States until 1849, having failed miserably in his efforts and even poorer than he was when he left.⁷⁵

During Howe's sojourn in England, American inventors continued to apply themselves to the problem of creating a functional sewing machine. In 1849, John Bachelder began tinkering with another sewing machine that had been patented earlier that year by Charles Morey and Joseph B. Johnson.⁷⁶ Bachelder obtained an improvement patent on Morey and Johnson's invention,⁷⁷ which claimed several additional elements of the successful sewing machine, including a horizontal table for holding the cloth, a vertical, reciprocating eye-pointed needle, and a more functional feeding mechanism for moving the cloth through the sewing machine.⁷⁸ Bachelder did not manufacture his sewing machine; rather, he later sold his patent to Singer, who brought it into the Sewing Machine Combination in

already lost hundreds of thousands of dollars in the nascent rubber industry in the 1820s and 1830s when products made from pure rubber lost their cohesion in hot weather or became brittle in cold weather. SLACK, *supra* note 37, at 27–32. Goodyear's invention of vulcanized rubber solved these problems, but it was difficult to convince firms and the buying public after so many failures and many spectacular financial wipeouts. *Id.* at 35–52. Similarly, Jack Kilby had difficulty initially convincing his employer, Texas Instruments, of the importance of his invention of the integrated circuit. With the company refusing to support his research, Kilby was forced to spend his vacation time at Texas Instruments inventing the product that would be the fountainhead for the entire digital revolution. See T.R. REID, *THE CHIP: HOW TWO AMERICANS INVENTED THE MICROCHIP AND LAUNCHED A REVOLUTION* 73–78 (2001).

72. See U.S. Patent No. 5942 (issued Nov. 28, 1848). Bradshaw failed to improve on the defects in Howe's invention. See COOPER, *supra* note 47, at 22.

73. See BRANDON, *supra* note 1, at 45 (detailing Singer's description of this problem with Howe's sewing machine).

74. *Id.* at 72 ("Singer had overcome the main defect of Howe's machine, which was that the cloth was fed through by means of a 'baster plate' of limited size to which it was attached . . . so that it was impossible to sew a long continuous seam, to sew curved seams or turn corners.").

75. See PARTON, *supra* note 70, at 12–14.

76. See U.S. Patent No. 6099 (issued Feb. 6, 1849).

77. See U.S. Patent No. 6439 (issued May 8, 1849).

78. See Frederick G. Bourne, *American Sewing-Machines*, in 2, 1795–1895: ONE HUNDRED YEARS OF AMERICAN COMMERCE 525, 531 (Chauncey M. Depew ed., 1968).

1856. This patent “eventually became one of the most important patents to be contributed to the ‘Sewing Machine Combination.’”⁷⁹

Later in 1849, another inventor, Sherburne C. Blodgett, received a patent on a “rotary sewing machine,” which used a revolving shuttle that carried the second thread in making the lockstitch. Unlike Howe and Bachelder, however, Blodgett joined forces with J.H. Lerow and began manufacturing the device, which soon came to be known as the “Lerow and Blodgett machine.”⁸⁰ This sewing machine was ungainly and, even worse, prone to failure.⁸¹ In fact, George Zeiber, one of Singer’s early business partners, was able to prompt Isaac Singer to begin experimentation on the sewing machine by complaining to him of the low quality of the Lerow & Blodgett machines: “Of a hundred and twenty completed machines, only eight or nine worked well enough to use in the tailor’s workrooms,” and of those, a fellow business partner “was constantly being called on to repair them.”⁸² (There will be more on Singer in a moment.)

By 1850, the combined inventive work of Howe, Bachelder, and Blodgett reached a critical mass, which prompted two more inventors to put the finishing touches on the final complete invention of a fully practical sewing machine. The penultimate inventor was Allen B. Wilson, who, according to one article, “must be awarded the highest meed of praise as an inventor, and for the ingenuity displayed in constructing and improving the sewing-machine.”⁸³ Wilson received a total of four patents on sewing machines, which issued between 1850 and 1854.⁸⁴ Many of these patents were central to the innovation of sewing machines made for home use, which had to be lighter and easier to use than the industrial variants being invented in the 1840s and early 1850s.⁸⁵

Foreshadowing the Sewing Machine War that was right around the corner, Wilson also had the unfortunate distinction of being the first sewing machine patentee threatened with litigation for infringing another sewing machine patent. After Wilson invented a double-pointed shuttle in 1848, A.P. Kline and Edward Lee, the owners of the Bradshaw patent,⁸⁶ threatened Wilson with a lawsuit for infringing their patent. Lacking the funds to defend himself, Wilson sold his patent rights to this particular invention to Kline and Lee to settle the dispute. In 1851, Wilson partnered with Nathaniel Wheeler, and the two formed the firm Wheeler, Wilson & Company, which began manufacturing sewing

79. COOPER, *supra* note 47, at 23.

80. BRANDON, *supra* note 1, at 43.

81. *Id.*

82. *Id.*

83. Bourne, *supra* note 78, at 526–27. Such sentiments have been seconded by others. See COOPER, *supra* note 47, at 26 (observing that Wilson “was one of the ablest of the early inventors in the field of mechanical stitching, and probably the most original”).

84. See U.S. Patent No. 7776 (issued Nov. 12, 1850); U.S. Patent No. 8296 (issued Aug. 12, 1851); U.S. Patent No. 9041 (issued June 15, 1852); U.S. Patent No. 12,116 (issued Dec. 19, 1854).

85. See COOPER, *supra* note 47, at 29 (“From the beginning, Wheeler and Wilson had looked beyond the use of the sewing machine solely by manufacturers and had seen the demand for a light-running, lightweight machine for sewing in the home.”).

86. See *supra* note 72 and accompanying text.

machines on the basis of Wilson's three subsequent patents.⁸⁷ It also soon entered the fray in the Sewing Machine War and would become one of the members of the Combination in 1856.

The American inventor who at last completed the development of the sewing machine was Isaac Merritt Singer. Singer was an irascible fellow who lived a very colorful life; he was a bigamist who married under various names at least five women over his lifetime, fathered at least eighteen children out of wedlock, and had a violent temper that often terrorized his family members, business partners, and professional associates.⁸⁸ Yet Singer was also a brilliant businessman with an innate sense of mechanics and a strong financial motivation. As he liked to quip, he was interested only in "the dimes, not the invention."⁸⁹

It was perhaps this motivation that caused him to relent to the request of his two business partners, George B. Zieber and Orson C. Phelps, to try his hand at improving the Lerow & Blodgett sewing machines that were constantly breaking down in Phelps's Boston workshop.⁹⁰ On September 18, 1850, Singer, Zieber, and Phelps entered into a contract, which provided that Singer would "contribute his inventive genius towards arranging a complete machine," that Zieber and Phelps would assist financially in the work, that Phelps would provide the sums necessary "to obtain a patent," and that "said patent shall be the equal property of the three partners to this agreement, each owning one-third thereof."⁹¹ Singer thus set to work on improving the sewing machine.

The breakthrough for Singer occurred approximately two weeks later. Singer later testified in one of the many patent infringement lawsuits that his act of invention occurred after having "worked at it day and night, sleeping but three or four hours a day out of the twenty-four, and eating generally but once a day, as I knew I must make it for the forty dollars or not get it at all."⁹² Among the various defects in the preceding sewing machines, including the curved eye-pointed needle that was brittle and easily breakable, the Lerow & Blodgett machine's rotating shuttle caused the second thread to unravel, making the combined lockstitch more prone to break.⁹³ Singer corrected these problems by replacing the curved needle with a straight needle that was positioned vertically rather than horizontally.⁹⁴ Moreover, he replaced the rotating shuttle with a reciprocating shuttle.⁹⁵ Unfortunately, at that point, the sewing machine would still not sew what Singer

87. Wilson seemed to have learned his lesson from his unfortunate experience with Kline & Lee, as his third patent, issued on June 15, 1852, covered his invention of a stationary bobbin for holding the second thread. He specifically invented the stationary bobbin in order to "avoid litigation which the reciprocating bobbin might have caused." COOPER, *supra* note 47, at 28. The stationary bobbin was tremendously successful. *Id.*

88. See EVANS, *supra* note 4, at 84–86.

89. BRANDON, *supra* note 1, at 93.

90. See *supra* note 82 and accompanying text.

91. BRANDON, *supra* note 1, at 46–47 (quoting the contract in its entirety).

92. COOPER, *supra* note 47, at 30 (quoting Singer's trial testimony reproduced in Chester McNeil, *A History of the Sewing Machine*, 3 UNION SALES BULL. 83 (1903)).

93. BRANDON, *supra* note 1, at 45.

94. COOPER, *supra* note 47, at 30.

95. BRANDON, *supra* note 1, at 45.

referred to as “tight stitches.”⁹⁶ With the assistance of Zieber, he struggled with this last-remaining issue, and, in his words, then “it flashed upon me” what he needed to do to make the sewing machine work.⁹⁷ (This is surprisingly similar rhetoric to that used by Morse in describing his own “flash of genius” in conceiving of the telegraph.⁹⁸) At this point, the problem was simply one of tension in the thread as it was fed by the spool to the eye-pointed needle. After fixing this last problem, he then produced “five stitches perfectly,” after which, he testified, he “took it to New York and employed Mr. Charles M. Keller to patent it.”⁹⁹

Singer’s sewing machine was invented in September 1850, and his patent ultimately issued on August 12, 1851.¹⁰⁰ Singer never pretended that he invented the sewing machine *ex nihilo*,¹⁰¹ and his patent confirms this. His invention was an improvement on preexisting sewing machines, such as the Lerow & Blodgett machine on which he worked in Phelps’s workshop. Specifically, he claimed and described a sewing machine in which the cloth rested on a horizontal table underneath an overhanging arm containing a vertical, reciprocating, straight eye-pointed needle. The eye-pointed needle was synchronized with a reciprocating shuttle carrying a second thread to make a lockstitch in the cloth,¹⁰² which was held in place by a presser foot as it was stitched.¹⁰³ A foot pedal provided continuous



Singer Sewing Machine
(ca. 1856)

96. COOPER, *supra* note 47, at 30 (quoting McNeil, *supra* note 92, at 83).

97. *Id.*

98. See *supra* note 38 and accompanying text. It is commonplace for inventors to claim that they had an immediate flash or insight. James Watt is reported to have had a flash of insight—“the idea came into my mind”—in conceiving of his steam engine during a walk along the Green of Glasgow. See ROSEN, *supra* note 56, at 115–16. Similarly, Philo Farnsworth flashed upon the idea of the electron gun—the key to his invention of television—while he was tilling his father’s farm. See EVAN I. SCHWARTZ, *THE LAST LONE INVENTOR* 20–21 (2002). Also, Edwin Howard Armstrong claimed that “his breakthrough idea” into the technology that made possible modern radio and television “came to him on a mountain in Vermont.” EVANS, *supra* note 4, at 222.

99. COOPER, *supra* note 47, at 30.

100. See U.S. Patent No. 8294 (issued Aug. 12, 1851). The picture is of a later model produced by Singer in 1856, but it shows some of the innovative elements of the sewing machine invented by Singer in 1850, such as the overhanging arm and the treadle. *The Turtle Back*, INT’L SEWING MACH. COLLECTORS’ SOC’Y, available at http://www.ismacs.net/singer_sewing_machine_company/singer_turtle_back_model_sewing_machine.html/ (last visited Jan. 27, 2011).

101. BRANDON, *supra* note 1, at 53.

102. COOPER, *supra* note 47, at 31–32; see also *supra* note 44 (describing how a lockstitch is made using two threads, an eye-pointed needle, and a shuttle).

103. Singer was unable to claim the presser foot as one of his original contributions to the sewing machine, but conventional wisdom maintains that Singer did in fact invent this device. See Bourne, *supra* note 78, at 527.

locomotive power to the sewing machine through a series of drive belts, which now made it possible for the sewing machine operator to exert seamless control over the continuous movement of the cloth.¹⁰⁴ Moreover, the synchronization of the reciprocating shuttle and the eye-pointed needle produced the necessary tension in the thread for continuous sewing in straight and curved lines. After decades of incremental inventive work and after so many failures, Singer's patent at long last contained all ten elements necessary for a practical and commercially successful sewing machine.¹⁰⁵ The ultimate utility of Singer's final improvements was irrefutable: a trained seamstress could sew by hand forty stitches per minute, and whereas Howe's machine could sew up to 250 stitches per minute, Singer's machine could produce 900 stitches per minute.¹⁰⁶

In their contract governing the invention and patenting of their sewing machine, Singer, Zieber, and Phelps had agreed to call it the "Jenny Lind Sewing Machine,"¹⁰⁷ after a famous Swedish opera singer who had taken the country by storm in the mid-nineteenth century, but after the sewing machine was invented, they identified it simply as the "Singer Sewing Machine."¹⁰⁸ They published their first newspaper advertisement on November 7, 1850, with a large headline in bold, capital letters, "SEWING BY MACHINERY."¹⁰⁹ Addressing their advertisement to "Journeyman Tailors, Sempstresses [sic], Employers, and all others interested in Sewing of any description," they touted that the "Singer & Phelps' Belay-stitch Sewing Machine, invented by Isaac M. Singer and manufactured by Singer & Phelps, no. 19 Harvard Place, Boston, Mass., is offered to the public as a perfect machine . . ." They ballyhooed that "much labor and study has been expended upon it by the inventor," and offered a one-year warranty that the machine would run "without repairs." They further bragged in the lengthy eight-paragraph

104. Singer later invented the use of a pivoting foot peddle, called a treadle, to power his sewing machine. The treadle was tremendously successful, and was used to run all sewing machines until electric motors replaced foot power. Singer, however, forgot to patent the treadle. See COOPER, *supra* note 47, at 33. He realized the mistake after he had used the treadle in public for more than two years, which prevented him under the patent statutes from applying for a patent. See Patent Act of 1839, ch. 88, § 7, 5 Stat. 354 (1839). Singer also invented, but did not patent, a wooden packing case that doubled as a table stand for the sewing machine when it was in use. BRANDON, *supra* note 1, at 73.

105. See *supra* note 45 and accompanying text. Frederick Bourne aptly describes each of these ten features in his article, *American Sewing-Machines*, in a lengthy sentence that describes the Singer Sewing Machine. See Bourne, *supra* note 78, at 527.

106. See EVANS, *supra* note 4, at 88.

107. BRANDON, *supra* note 1, at 46.

108. COOPER, *supra* note 47, at 30. Zieber later explained:

At first, I thought we should call the machine the *Jenny Lind* in honor of the famous singer whom Barnum had just brought over from Europe, but then I realized that this might drop out of fashion and I asked whether we could use his name. At first he was very unwilling to allow this, saying that he felt it dishonorable for a Shakespearean actor to concern himself with such trivialities, but in the end the play on words appealed to him, and he agreed.

BRANDON, *supra* note 1, at 51.

109. BRANDON, *supra* note 1, at 50. All quotes taken from this ad are from this monograph.

advertisement: “From 500 to 1500 stitches, according to the fabric operated upon, may be taken per minute.” On that same day, the *Boston Daily Times* reported on the invention of the Singer Sewing Machine, observing that the “machine can be worked by any woman of common intelligence . . . and is in fact, the prettiest, simplest and most effective result of mechanical skill that we ever saw.”¹¹⁰

Given the difficulties with the previous sewing machines invented by Howe, Blodgett, and the many others that had come before them, such declarations were not hyperbole. The Singer Sewing Machine did indeed work as advertised. Unfortunately for Singer, Howe had returned from England in April 1849,¹¹¹ and he quickly discovered that the American public was swept up with a newfound interest in the labor-saving potential of sewing machines. As one historian writes: “Mechanics had read of [Howe’s] device or seen it demonstrated, and had turned their hand to producing something similar. The Lerow & Blodgett machine which had been the basis for Singer’s improvements was one such piece of work.”¹¹² In late 1850, Singer had not heard of Howe, but the casual chain of incremental innovation that linked Howe to Singer was very real. As a result, Howe would soon unleash a torrent of litigation against Singer and others that would ultimately culminate in the Sewing Machine War in the mid-1850s.

II. THE FIRST AMERICAN PATENT THICKET: THE SEWING MACHINE WAR

One man does not make a patent thicket, no matter how obstreperous he may be. Howe certainly played a key role in the Sewing Machine War, as was well recognized by his contemporaries. An 1867 magazine article reported that “the secret of Mr. Howe’s success” was that “he litigated himself into fortune and fame.”¹¹³ But the Sewing Machine War is not a story of a single aggressor, Elias Howe, against the sewing machine manufacturing world. Howe fired the first shots, and his litigation against Singer’s company (I.M. Singer & Co.) was the most lengthy and extensive, but he was not the only plaintiff. In fact, within a few short years, Howe found himself named as a defendant in the many lawsuits that were being filed by and against sewing machine patentees and manufacturers.¹¹⁴

Shortly after his return from England in 1849, Howe inspected some of the new sewing machines that were now on sale and he concluded that they infringed his 1846 patent.¹¹⁵ Regardless of what other features these new sewing machines may have exhibited, they used an eye-pointed needle in combination with a shuttle carrying a second thread to create a lockstitch, the central elements

110. *Id.* at 51.

111. *Id.* at 66.

112. *Id.* at 71.

113. *Who Invented Sewing-Machines?*, in 4 THE GALAXY 471, 479 (1867) (emphasis omitted).

114. See COOPER, *supra* note 47, at 41 (noting how, after Howe obtained injunctions and licenses through settlements, he was immediately sued “in another series of legal battles in which he was the defendant”).

115. BRANDON, *supra* note 1, at 71.

claimed in Howe's patent.¹¹⁶ As a prominent figure in the sewing machine industry would attest in 1860: "I believe Mr. Howe's invention to have been both the root and the trunk upon which all the subsequent art has been engrafted, and from which it has grown."¹¹⁷ Since he was destitute,¹¹⁸ Howe required an investor to finance his patent infringement lawsuits, and he at last convinced George W. Bliss to invest in his litigation strategy (as well as purchase a one-half interest in Howe's patent from a previous financial backer, George Fisher, who had not realized any return on his investment).¹¹⁹ At this point, Howe was ready to undertake "his main preoccupation—indeed, his main occupation—for the next several years: namely, suing the infringers of his patent for royalties."¹²⁰

The moment when Singer came within Howe's sights was when Howe witnessed a demonstration of a Singer Sewing Machine—by none other than one of Singer's sons—in a storefront window in New York City sometime in late 1850.¹²¹ Howe quickly contacted Singer, asserting that the Singer Sewing Machine infringed Howe's 1846 patent. In the ensuing negotiations, Howe demanded a \$2000 royalty payment from I.M. Singer & Co., but the firm had not yet had any success in selling its new sewing machine and thus it did not have the monies to pay Howe.¹²² Singer's characteristically hotheaded nature asserted itself: he argued with Howe, and then he "threatened to kick him down the steps of the machine shop."¹²³ The negotiations thus ended, and George Zieber later observed sardonically that "Mr. Howe lived to be thankful for the exhibition of Singer's amiable disposition on that occasion."¹²⁴

116. Amasa Howe (Elias Howe's brother and one of his licensees) testified in 1860 that during Howe's time in England "[t]here were some machines made and put into operation embracing the principles of his patent." BEFORE THE HONORABLE PHILIP F. THOMAS, COMMISSIONER OF PATENTS. IN THE MATTER OF THE APPLICATION OF ELIAS HOWE, JR., FOR AN EXTENSION OF HIS PATENT FOR SEWING MACHINES. TESTIMONY TAKEN ON THE PART OF THE APPLICANT, ELIAS HOWE, JR. 29 (George Gifford ed., 1860) [hereinafter IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION]; see also *supra* note 67 and accompanying text (discussing elements in Howe's 1846 patent).

117. IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION, *supra* note 116, at 133 (testimony of Orlando B. Potter). Potter proposed the Sewing Machine Combination in 1856, the solution to the Sewing Machine War. See *infra* note 198 and accompanying text.

118. See IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION, *supra* note 116, at 109 (testimony of Orson C. Phelps) ("From his own representations [at the time he sued I.M. Singer & Co.] I should judge that he was extremely poor, actually in destitute circumstances.").

119. BRANDON, *supra* note 1, at 72. In exchange for a partial ownership interest in his 1846 patent, Fisher provided Howe with approximately \$2000. See IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION, *supra* note 116, at 68 (testimony of George Fisher). After Howe's return from England, Fisher refused to provide him with any more monies, "[b]ecause I had lost confidence in its ever paying any thing." *Id.* at 69. Fisher thus sold his one-half interest to Bliss for approximately \$3500. *Id.*

120. BRANDON, *supra* note 1, at 71–72.

121. *Id.* at 74–76.

122. *Id.* at 76.

123. *Id.*

124. *Id.*

Howe returned in 1851 and again asserted his patent rights and demanded recompense from I.M. Singer & Co. This time Howe requested \$25,000 for a license to settle the dispute.¹²⁵ (This amounts to approximately \$657,750 today.)¹²⁶ Singer again demurred. Singer's attorney and new business partner, Edward Clark,¹²⁷ wrote in an 1852 letter that "Howe is a perfect humbug. He knows quite well he never invented anything of value. We have sued him for saying that he is entitled exclusively to use of the combination of needle and shuttle"¹²⁸ It is unclear if I.M. Singer & Co. had in fact sued Howe at this point, but Clark would soon rue such sentiments.

Howe now made good on his threats, and he promptly sued I.M. Singer & Co. and several other sewing machine manufacturers for patent infringement. Howe's suit against Lerow & Blodgett was the first that came to trial in late June 1852, and after three weeks, during which it was reported that the "case was very closely contested," Judge Sprague ruled in Howe's favor on July 12, 1852.¹²⁹ On the basis of this legal determination of infringement, Howe quickly obtained preliminary injunctions against Singer and the remaining defendants.¹³⁰ For many sewing machine firms, this was too much to handle, and they began to settle and accept Howe's terms. On May 18, 1853, Howe granted his first license to Wheeler, Wilson & Co., and shortly thereafter other manufacturers caved and paid Howe for the use of his patent rights.¹³¹ On September 3, 1853, the *New York Daily Tribune* reported that Howe had granted licenses to many sewing machine firms; in addition to Lerow & Blodgett and Wheeler, Wilson & Co., Howe had licensed Bartholf, the American Magnetic Sewing Machine Co., Nichols & Bliss, and Woolridge, Keene & Moore.¹³² Grover & Baker also submitted.¹³³ These sewing

125. COOPER, *supra* note 47, at 33.

126. See *Consumer Price Index (Estimate)*, FED. RESERVE BANK OF MINNEAPOLIS, http://www.minneapolisfed.org/community_education/teacher/calc/hist1800.cfm (last visited Jan. 11, 2011) (noting that \$1 in 1850 is worth \$26.31 in 2010).

127. Given his fractious nature, Singer's dealings with his business partners read like a plotline for a soap opera. After his invention of the sewing machine in the fall of 1850, Singer repeatedly terrorized his first two business partners, George Zieber and Orson Phelps, with his trademark temper. He ultimately cajoled them out of the business in 1851, which included taking advantage of Zieber during his convalescence in late 1851. Compared to the monies he would eventually make on the sewing machine, Singer paid Zieber and Phelps a mere pittance for their share in the business. After breaking with Zieber and Phelps in 1851, Singer formed a business partnership with Edward Clark, the attorney representing him in his legal contest with Howe. See EVANS, *supra* note 4, at 90.

128. See BRANDON, *supra* note 1, at 89 (quoting Clark without citation). There is no extant record of a lawsuit filed by Singer's company against Howe in 1853.

129. See *Interesting Patent Case*, 7 SCI. AM. 356, 356 (1852).

130. COOPER, *supra* note 47, at 33, 41.

131. *Id.* at 24.

132. See *id.* at 41 n.64.

133. See *IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION*, *supra* note 116, at 136-37 (testimony of Orlando B. Potter) ("Mr. Howe requested and demanded of our company and of Wheeler, Wilson & Co., that we and they should submit to and pay a license to his patent. . . . [O]ur company agreed to do so upon certain conditions, . . . that Mr. Howe should not license under his patent infringements upon the patents of our

machine manufacturers were now paying Howe \$25 for each sewing machine they produced.¹³⁴

By 1853, the last firm standing against Howe was I.M. Singer & Co., and their legal battle soon spilled out into the newspapers. On July 29, 1853, Howe published the following newspaper advertisement:

The Sewing Machine—It has been recently decided by the United States Court that Elias Howe, Jr., of No. 305 Broadway, was the originator of the Sewing Machines now extensively used. Call at his office and see forty of them in constant use upon cloth, leather, etc., and judge for yourselves as to their practicability. Also see a certified copy, from the records of the United States Court, of the injunction against Singer's machine (so called) which is conclusive. . . . You that want sewing machines, be cautious how you purchase them of others than him or those licensed under him, else the law will compel you to pay twice over.¹³⁵

On the same page of the newspaper in which Howe's combined advertisement and legal notice appeared, I.M. Singer & Co. published the following competing advertisement:

Sewing Machines.—For the last two years Elias Howe, Jr., of Massachusetts, has been threatening suits and injunctions against all the world who make, use or sell Sewing Machines We have sold many machines—are selling them rapidly, and have good right to sell them. The public do not acknowledge Mr. Howe's pretensions, and for the best of reasons. 1. Machines made according to Howe's patent are of no practical use. He tried several years without being able to introduce one. 2. It is notorious, especially in New-York, that Howe was not the original inventor of the machine combining the needle and shuttle, and that his claim to that is not valid Finally—We make and sell the best SEWING MACHINES¹³⁶

Howe responded to such advertisements by charging I.M. Singer & Co. with libel,¹³⁷ and he promptly filed suit against the *New York Daily Tribune* for publishing it. Howe's libel suit was too much even for the *Scientific American*, which was a solid supporter of Howe's rights as the first American inventor of the

company . . . and when we took our license it was engrafted therein as one of its provisions.”).

134. See BISSELL, *supra* note 4, at 86. The *New York Times* reported in 1860, however, that Howe's licensees paid him “tribute” on the basis of a “‘sliding scale,’ so that the fee for each machine diminished in proportion as the number sold for the year increases.” *The Story of the Sewing-Machine*, N.Y. TIMES, Jan. 7, 1860, at 2.

135. BRANDON, *supra* note 1, at 90.

136. *Id.*

137. See *id.* at 90–91 (“CAUTION. ALL PERSONS ARE CAUTIONED against publishing the libelous advertisements of I.M. Singer & Co. against me as they will be prosecuted to the fullest extent of the law for such publications.”).

sewing machine that produced a lockstitch.¹³⁸ On August 20, 1853, the magazine opined: “We certainly do not think that Mr. Howe is justified in suing the ‘Tribune’ for libel, but neither was it right for that paper to admit the advertisement of Singer, containing, as it did, such pointed and offensive language.”¹³⁹

The other sewing machine manufacturers who had taken out licenses were now supporting Howe insofar as they had made substantial investments in ratifying Howe’s patent rights. This situation led one anonymous, albeit pro-Singer, correspondent to write in another newspaper:

All the other manufacturers had yielded to Howe . . . They viewed the contest between Howe and Singer & Co. much as the traditional frontiersman’s wife regarded a terrible struggle between her husband and a grizzly, merely remarking that “it didn’t make much odds to her which won, but she allus [sic] loved to see a right lively fight.”¹⁴⁰

Singer’s infamous temper also raged against Howe and the firms that had settled with him; Zieber later described how Singer “raved to put his foot upon the neck of Howe.”¹⁴¹ Given the potentially large fortune at stake in the lawsuit, combined with a sense of personal indignation at being challenged as an inventor, neither Singer nor Howe budged from their respective aggressive litigation stances. Soon I.M. Singer & Co.’s profits and energies were almost entirely consumed with its legal battle with Howe.¹⁴²

Singer’s newspaper advertisements were carefully worded to avoid claiming that he was not infringing Howe’s patent because there was no question that the Singer Sewing Machine, invented in 1850, infringed Howe’s 1846 patent. Singer’s newspaper advertisements thus reveal that he undertook the same arduous

138. See, e.g., *The Fair of the American Institute: Howe’s First Sewing Machine*, 13 SCI. AM. 264, 264 (1865) (reporting on the exhibit of Howe’s first sewing machine, which “contains . . . that essential improvement—a device for passing a second thread through a loop in the first—which stops the thread from unraveling—the idea that made mechanical sewing a practical art”).

139. *Patent Law Suits—Sewing Machines*, 8 SCI. AM. 389, 389 (1853). The magazine further used this opportunity to condemn the state of the federal courts in terms that are surprisingly similar to those used today:

This case affords another illustration of the defectiveness of our United States Chancery Courts with their miserable old and complicated slow machinery. . . . Some patent cases before our United States Courts might well be represented by a snake with its tail in its mouth endeavoring to swallow itself. . . . Among the many new inventions which are still wanting to benefit mankind, we recommend inventors to try their genius and skill in improving our United States Courts in patent trials.

Id.

140. BRANDON, *supra* note 1, at 91.

141. *Id.* at 91. Zieber noted that Singer also raged against Howe’s new licensees: “Wheeler and Wilson, he said, ‘were trying to rob him,’ and Potter of the Grover and Baker Co., ‘was a damn scoundrel.’ He cursed the *Scientific American*, because ‘it did not do him justice’—and Wilcox and Gibbs caused him to pass many unhappy hours.” *Id.*

142. See *id.* at 89.

and expensive task that many defendants in patent infringement lawsuits attempt today: he sought to invalidate Howe's patent by uncovering prior art that would undermine Howe's claim to originality in his invention. The previous inventions and uses of the eye-pointed needle by European inventors were of no use to Singer,¹⁴³ because Howe claimed as his invention the novel *combination* of the eye-pointed needle and a shuttle in creating a lockstitch. Singer thus began looking for someone who had invented this unique combination of elements in the sewing machine.

Singer first attempted to uncover prior art in the patent offices in England, France, and, of course, the United States. He even went so far as to argue that the sewing machine had long been invented in China, but this was all to no avail.¹⁴⁴ Singer's efforts proved fruitless until he discovered Walter Hunt, a prolific American antebellum inventor.¹⁴⁵ Hunt claimed to have invented a sewing machine that used an eye-pointed needle in combination with a shuttle carrying a second thread that produced a lockstitch, and that he had done this in 1834—approximately ten years before Howe invented his own sewing machine! The problem was that Hunt had never commercialized his invention, nor had he applied for a patent.

Beginning in 1852, Singer bankrolled Hunt in his efforts to rediscover his once-forgotten invention, and Hunt seemed to have hit pay dirt when he found some “rusty and broken pieces of metal” in an attic of the workshop at which Hunt worked in 1834.¹⁴⁶ But Hunt had difficulty in recreating a working sewing machine from these nineteen-year-old remnants,¹⁴⁷ and thus Singer provided Hunt with some legal and technical advisors, including William Whiting. As a lawyer recalled the scene years later in another patent suit, Whiting “was brought to bear upon the parts of the old carcass,” and, “after the lapse of many days, informed Mr. Hunt what he might have done, and Mr. Hunt . . . agreed, and subsequently insisted, that that was just what he did do.”¹⁴⁸ With Hunt's rebuilt sewing machine

143. See *supra* notes 47–51 and accompanying text.

144. PARTON, *supra* note 70, at 19.

145. See generally JOSEPH NATHAN KANE, *NECESSITY'S CHILD: THE STORY OF WALTER HUNT, AMERICA'S FORGOTTEN INVENTOR* (1997).

146. See BRANDON, *supra* note 1, at 92. Several people would testify that mechanics and other employees associated with I.M. Singer & Co., including one of its principals, Edward Clark, were in constant contact with, and were providing material support to, Hunt during his efforts at recreating his 1834 invention. See *IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION*, *supra* note 116, at 3–4, 11–12, 17 (testimony of Sewall Gleason, Daniel G. Rollin, and John P. Bowker, Jr.).

147. See *IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION*, *supra* note 116, at 3 (testimony of Sewall Gleason) (reporting from firsthand observations that, during his efforts from 1852 until 1853 in recreating his 1834 invention, “Mr. Hunt had difficulty in forming the machine”).

148. See BRANDON, *supra* note 1, at 93 (emphasis omitted). Orlando Potter, the attorney and president of Grover & Baker, testified that sometime in 1853 “Mr. Whiting met me in the street, and stated to me that he had got a theory upon which he thought a sewing machine could be constructed and operated upon, and in connection with the old relics. He said he was going to send for Mr. Hunt He said if Mr. Hunt adopted it, he

as evidence corroborating his claim of invention in 1834, Singer seemingly had within his grasp the prior art necessary to invalidate Howe's 1846 patent.

In the fall of 1853, Hunt applied for a patent on his sewing machine invention, claiming an invention date of 1834. His patent application was not received well at the *Scientific American*, which leapt to Howe's defense against what it saw as a pretender to the sewing machine throne. The magazine opened its October 1, 1853 article on the subject with this telling remark: "There never was a useful invention of any importance brought before the public to which there was not more than one who laid claim to be the inventor."¹⁴⁹ The magazine then republished Hunt's lengthy advertisement in the *New York Daily Tribune* from September 19, 1853, which declared, in part:

TO THE PUBLIC—I perceive that Elias Howe, Jr., is advertising himself as patentee of the Original Sewing Machine These statements I contradict . . . Howe was not the original and first inventor of the machine on which he obtained his patent. He did not invent the needle with the eye near the point. He was not the original inventor of the combination of the eye-pointed needle and the shuttle, making the interlocked stitch with two threads, now in common use. . . . I have taken measures . . . to enforce my rights by applying for a patent for my original invention.¹⁵⁰

The *Scientific American* denounced Hunt's belated patent application in no uncertain terms, saying that it was "opposed to such rusty claims," and that "it has rather an ugly appearance to set up ten years' prior claims to the lock stitch and eye-pointed needle."¹⁵¹ It called for a quick legal resolution of this controversy "in order that the ear of the public may not be used as a kettle drum on which to beat the loudest tones for personal purposes."¹⁵²

What followed was an extensive priority battle in the Patent Office (known in patent parlance as an interference action).¹⁵³ Over the next eight months, Patent Commissioner Charles Mason received "hundreds of pages of sworn testimony" proffered on behalf of Hunt's claims to being the original inventor of the lockstitch produced from a combination of an eye-pointed needle

intended to place it before the court as an answer to Mr. Howe's patent." IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION, *supra* note 116, at 148.

149. *Sewing Machine Controversy*, 9 SCI. AM. 21, 21 (1853). On a similar note, when *Scientific American* sensed the imminent explosion of the Sewing Machine War, it bemoaned that it is "to be regretted, namely, that whenever a patent becomes valuable, there seems to be no end, at least, for some time, to the troubles of the real benefactor—the one who has rendered it a public benefit." *Sewing Machine Decision*, 9 SCI. AM. 245, 245 (1854).

150. *Sewing Machine Controversy*, *supra* note 149, at 21.

151. *Id.*

152. *Id.*

153. The modern statutory provision governing priority battles is 35 U.S.C. § 102(g) (2006). The Director of the Patent & Trademark Office is authorized to declare an interference and to adjudicate the rightful claimant to a patent under 35 U.S.C. § 135 (2006).

and shuttle.¹⁵⁴ Commissioner Mason at last ruled on May 24, 1854 that Howe was entitled to his patent.¹⁵⁵ Mason acknowledged that Hunt invented the elements of the sewing machine that later comprised Howe's patented invention, but that Hunt committed laches in waiting eighteen years after his date of invention before filing his patent application. In patent law terminology, Commissioner Mason found that Hunt had "abandoned" his invention after 1834, and thus lost his right to receive a patent. Hunt's abandonment was particularly salient given that another inventor, Howe, had brought the same invention public by patenting it in the interim.¹⁵⁶ Hunt appealed Mason's decision to the Circuit Court of the District of Columbia, asserting a whole slew of legal issues, including even a nascent administrative law claim that Mason, as Patent Commissioner, lacked statutory authority to decide a priority battle on the basis of abandonment. In an extensive opinion analyzing all points of Hunt's arguments, Circuit Judge Morsell soundly affirmed Commissioner Mason's decision.¹⁵⁷

Despite Hunt's loss in the D.C. Circuit Court in 1855, which brought this satellite litigation to its final conclusion, Howe would be bedeviled for many years by Hunt's fortuitous "rediscovery" of his invention. In Howe's subsequent lawsuits, some defendants succeeded in retrying the issue of whether Hunt's work in 1834 anticipated Howe's invention nine years later.¹⁵⁸ Such efforts were to no avail, but these counterclaims certainly imposed additional costs on Howe in his enforcement of his property rights in the sewing machine.

Hunt's loss in the priority contest, however, had a more immediate impact in Howe's ongoing legal contest with Singer. Howe quickly filed lawsuits in Boston against firms selling Singer Sewing Machines, and, as before, he sought preliminary injunctions. In ruling on Howe's request for these preliminary injunctions, Judge Sprague acknowledged the "earnestness and zeal with which the contestation has been carried on" in this case and in the many other legal actions.¹⁵⁹ Following a lengthy review of the arguments against Howe, Judge Sprague ultimately concluded: "There is no evidence in this case, that leaves a shadow of doubt, that, for all the benefit conferred upon the public by the introduction of a sewing machine, the public are indebted to Mr. Howe."¹⁶⁰ The defendants also argued again that Hunt had anticipated Howe's invention, despite Hunt's earlier defeat before Commissioner Mason and Circuit Judge Morsell.

154. See *Who Invented Sewing-Machines?*, *supra* note 113, at 474.

155. See BRANDON, *supra* note 1, at 95.

156. *Id.* Commissioner Mason wrote:

When the first inventor allows his discovery to slumber for eighteen years, with no probability of its ever being brought into useful activity, and when it is only resurrected to supplant and strangle an invention which has been given to the public, and which has been made practically useful, all reasonable presumption should be in favor of the inventor who has been the means of conferring the real benefit upon the world.

Id.

157. Hunt v. Howe, 12 F. Cas. 918, 922 (C.C.D.C. 1855) (No. 6891).

158. See, e.g., Howe v. Williams, 12 F. Cas. 689, 695-96 (C.C.D. Mass. 1863) (No. 6778).

159. Howe v. Underwood, 12 F. Cas. 678, 679 (C.C.D. Mass. 1854) (No. 6775).

160. *Id.* at 680.

After carefully analyzing (again) the evidence of the reconstruction of Hunt's invention in 1853, Judge Sprague coolly remarked that "[p]rophecy after the event is easy prophecy."¹⁶¹ Judge Sprague thus ruled Howe's patent valid and infringed, and issued a preliminary injunction.¹⁶² The firms settled with Howe, who then promptly filed lawsuits directly against Singer in federal courts in New Jersey and New York, once more requesting injunctions.¹⁶³

At this point, the historical record is a bit muddled as to what happened next. One historian claims that I.M. Singer & Co. was ordered to pay Howe \$15,000 in damages,¹⁶⁴ but there is no extant court decision confirming this report. Moreover, it is likely incorrect given the procedural and substantive separation between equity and law that still prevailed within the federal judiciary at the time.¹⁶⁵ Others have written that I.M. Singer & Co. settled with Howe on July 1, 1854, agreeing to pay Howe \$15,000 to settle their dispute,¹⁶⁶ which is likely what occurred. To wit, I.M. Singer & Co. decided to negotiate a settlement rather than face the imminent injunction that would almost certainly be issued against it. In addition to the \$15,000 settlement, Singer further agreed to pay Howe a \$25 royalty, consistent with Howe's other license agreements,¹⁶⁷ for each Singer Sewing Machine produced thereafter.¹⁶⁸

The end of the long-running legal dispute between Singer and Howe marked not the end of the Sewing Machine War, but its explosion into a full-scale patent thicket. The typical story of the Sewing Machine War is that the incremental invention of the sewing machine through complementary contributions by differing inventors now came to its full fruition with a litany of patent infringement lawsuits. However, Howe and Singer may have had something to do with this descent into full-scale legal warfare with the official public announcements of their settlement of the "long protracted legal controversy."¹⁶⁹ In the August 12, 1854 issue of the *Scientific American*, for instance, they concluded their settlement announcement with the following dire warning: "We caution the public against buying any of the numerous inferior machines in the market. They all infringe one, and some of them several, of our patents, and those who attempt to use them will be prosecuted."¹⁷⁰ It perhaps should be unsurprising that, after

161. *Id.* at 685.

162. *Id.* at 687.

163. *Who Invented Sewing-Machines?*, *supra* note 113, at 480.

164. *See* BRANDON, *supra* note 1, at 95.

165. The Constitution provides that "[t]he judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, [or] the Laws of the United States." U.S. CONST. art. III, § 2, cl. 1; *see also* JOHN H. LANGBEIN ET AL., *HISTORY OF THE COMMON LAW* 381–82 (2009) (describing the law–equity distinction in the federal courts).

166. *See* BISSELL, *supra* note 4, at 85 ("On July 1, Singer and Clark paid Howe \$15,000 and further agreed to pay Howe a licensing fee for every sewing machine they made."); Bourne, *supra* note 78, at 526 ("I.M. Singer & Company submitted to the decree of the court, and July 1, 1854, took out a license under the Howe patent, and paid him \$15,000 in settlement of license on machines made and sold prior to that time.").

167. *See supra* note 134 and accompanying text.

168. *See* BRANDON, *supra* note 1, at 95.

169. *Sewing Machines—Card to the Public*, 9 SCI. AM. 383, 383 (1854).

170. *Id.*

Howe and Singer concluded their dispute, “all the sewing machine manufacturers got busily down to the job of suing each other out of existence.”¹⁷¹

Although it was no longer defending itself against Howe, I.M. Singer & Co. was soon defending itself against numerous patent owners in more than twenty separate lawsuits filed in three or four different venues, including Philadelphia, the Northern District of New York, and the Southern District of New York.¹⁷² I.M. Singer & Co. was not just a defendant, as it filed lawsuits in federal court in Philadelphia against Grover & Baker and Wheeler, Wilson & Co., two of its main competitors in the sewing machine market.¹⁷³ Howe was also soon defending himself in lawsuits in which he was charged with infringing the other elements of the fully practical sewing machine that had been invented by others.¹⁷⁴

The sheer number of lawsuits was not the only problem. These were patent infringement lawsuits, requiring testimony and documentation of detailed technical evidence concerning both the infringing product and the patented invention. The deposition testimony taken in a single lawsuit filed by Grover & Baker, for instance, was reported at the time to have “fill[ed] two immense volumes, containing three thousand five hundred and seventy-five pages.”¹⁷⁵ In an age before computers, word processors or typewriters, producing more than 3500 pages of legal transcripts for a single case was no small feat. This was not an unusual case either, as Singer was reported to have “made a special closet to hold his [legal] files,” and “Wheeler and Wilson had several closet shelves filled with testimony.”¹⁷⁶ An author of a nineteenth-century monograph detailing the history of the sewing machine reported that it had pieced together Elias Howe’s life story, in part, from having “gone over *thirty thousand pages* of printed testimony, taken in the numerous suits to which sewing machine patents have given rise.”¹⁷⁷ A modern historian has observed that “the continuing court litigation over rival patent rights seemed destined to ruin the economics of the new industry.”¹⁷⁸

Although these details of the Sewing Machine War are well known, at least to some historians, no one has yet explained why this patent thicket arose beyond identifying the fact that there were overlapping patent claims. But overlapping patents do not by themselves create a patent thicket.¹⁷⁹ There must be

171. BRANDON, *supra* note 1, at 95.

172. *Id.* at 96–97.

173. *Id.* at 97.

174. See COOPER, *supra* note 47, at 41 (noting how, after Howe obtained injunctions and licenses through settlements, he was immediately sued “in another series of legal battles in which he was the defendant”). This reflects Howe’s strategic mistake in not safeguarding himself against infringement lawsuits in his earlier licenses, as evidenced by his license with Grover & Baker and Wheeler, Wilson & Co. See *supra* note 133.

175. BRANDON, *supra* note 1, at 96.

176. EWERS & BAYLOR, *supra* note 2, at 39. Brandon quotes one source as describing Wheeler & Wilson’s collection as “a library of similar volumes, resembling in appearance a quantity of London and Paris Directories.” BRANDON, *supra* note 1, at 96.

177. PARTON, *supra* note 70, at 11–12 (emphasis added).

178. COOPER, *supra* note 47, at 35.

179. See *infra* notes 267–268 and accompanying text (discussing heterogeneous factors that cause patent thickets).

reasons why patent owners assert their property rights against each other to the point of creating a litigation free-for-all, replicating the conditions of Thomas Hobbes's state of nature.¹⁸⁰

From the historical record, it is possible to glean several reasons for the rise of the Sewing Machine War. First, in the early 1850s, the sewing machine was not yet a commercially successful product, and in fact there had been numerous failures by both inventors and firms. On both sides of the Atlantic, Howe had attempted to secure financing to manufacture and sell his invention in the late 1840s, but failed.¹⁸¹ Even Sherburne Blodgett was skeptical of their commercial promise, although the Lerow & Blodgett firm was the first large-scale American manufacturer of sewing machines, which were produced under Blodgett's patent. In fact, it was a Lerow & Blodgett sewing machine on which Singer tinkered in 1850, leading Singer to make his contributions to this soon-to-be valuable commercial product.¹⁸² Yet, after I.M. Singer & Co. began selling the Singer Sewing Machine in late 1850, Blodgett reportedly told Singer that he was an idiot for trying to manufacture and sell sewing machines. Sewing machines simply would not work, Blodgett told him, and the only profit a sewing machine patentee could make was in selling territorial licenses in the patent itself.¹⁸³ Singer's early sales experiences confirmed Blodgett's pessimism, as he would later write: "I met with continual objections to the introduction of my machine from persons who had bought those of prior inventors and had thrown them aside as useless, and in some cases was showed out of the stores where I called as soon as my business was made known by me."¹⁸⁴

Second, in addition to the well-grounded skepticism of the buying public about the practicality of a sewing machine, there were cultural forces at work in nineteenth-century America that created roadblocks to the efficient adoption of sewing machines throughout the sewing trade. Thimonnier's story was well known to Americans,¹⁸⁵ and the spirit of the French luddites who had destroyed Thimonnier's Paris workshop and had hounded him out of the country was appearing in pockets of American resistance to the sewing machine.¹⁸⁶ Moreover,

180. See THOMAS HOBBS, *LEVIATHAN* 107 (Herbert W. Schneider ed., The Liberal Arts Press 1958) (1651) (observing that in the state of nature there is "continual fear and danger of violent death; and the life of man solitary, poor, nasty, brutish, and short").

181. See *supra* notes 71–75 and accompanying text.

182. See *supra* note 82 and accompanying text.

183. BRANDON, *supra* note 1, at 51–52.

184. *Id.* at 70.

185. See, e.g., *The Sewing Machine—Its Origin and Suggestions for Improvement*, 20 SCI. AM. 246, 246 (1869); see also *supra* notes 54–56 and accompanying text (describing Thimonnier's work and tragic downfall).

186. See BRANDON, *supra* note 1, at 69; see also PARTON, *supra* note 70, at 9 (noting that Howe's failure to commercialize his patented sewing machine resulted in part from tailors who "thought it would beggar all hand sewers, and refrained from using it on principle"); *IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION*, *supra* note 116, at 36 (testimony of Amasa Howe) ("There were several obstacles and objections [to Howe's attempts to commercialize his sewing machine] . . . Journeymen tailors objected to working with machines. They would not finish after machines. . . . The prejudice still exists among certain classes of journeymen tailors, those who learned their trade by hand work.").

there was a strong cultural bias against the use of machines by women—the principal source of hand-sewing labor in the nineteenth century. For instance, Singer at first dismissed the entreaties of his business partners in 1850 to tinker with the Lerow & Blodgett sewing machine, responding in his usual hotheaded manner, “What a devilish machine! You want to do away with the only thing that keeps women quiet, their sewing!”¹⁸⁷ Although Singer eventually acted against his chauvinism, he was not alone in thinking such things.¹⁸⁸

Worse yet, the luddites who were agitating the sewing unions to oppose the sewing machine used these widespread prejudices to reinforce their arguments. In an 1858 address to the Shirt Sewers’ and Seamstresses’ Union, a speaker warned of the “disastrous consequences” to the hand-sewing female laborers resulting from the mass adoption of the sewing machine in the sewing trade, arguing “that peculiar branch of industry which exclusively belonged to women—that industry which developed itself in the facile and pliant use of the fingers—would be totally extinguished.”¹⁸⁹ In sum, in the early 1850s, the financial success of the sewing machine was still an abstraction, but many prior failures, a skeptical public, an anti-industrial bias, and existing cultural prejudices were a concrete reality.

Third, in contrast to the practical and cultural difficulties in successfully commercializing sewing machines, Howe succeeded brilliantly in the infringement lawsuits he began filing in 1852. As a result of his injunctions and licenses, Howe was in control of the nascent industry and was making money hand over fist, or at least it seemed as much to the firms who were paying royalties to Howe while struggling with the vicissitudes of the new sewing machine market. Howe’s patent, which had done nothing in the six years since its issuance in 1846 to remedy the inventor’s extreme poverty, was now producing an income of “a few hundred[] a year.”¹⁹⁰ By 1860, he claimed to have earned \$444,000 in profits from licensing his patent, which he attested to in his application for a seven-year extension on his patent term (which was granted).¹⁹¹ When his patent finally expired in 1867, as a result of his participation in the Sewing Machine Combination, his royalties totaled more than \$2 million.¹⁹² Such extensive licensing profits led one anonymous writer in 1867 to complain that Howe had “been overpaid for his inventive labors,”¹⁹³ or, as some patent scholars would say today, Howe exploited “royalty stacking” to obtain license fees exceeding his incremental contribution.¹⁹⁴ By the early 1860s,

187. EVANS, *supra* note 4, at 88.

188. Cf. McCULLOUGH, *supra* note 62, at 462 (describing “common gossip” that Emily Roebling was the real source “behind the great work” of Chief Engineer Washington Roebling, who was stricken in constructing the Brooklyn Bridge, “which as a general proposition was taken in some quarters to be both preposterous and calamitous”).

189. BRANDON, *supra* note 1, at 70.

190. PARTON, *supra* note 70, at 21.

191. Seamstress, Letter to the Editor, *The Sewing-Machine Patent*, N.Y. TIMES, Aug. 10, 1860, at 8. Brandon writes that Howe had reported profits of \$468,000. See BRANDON, *supra* note 1, at 99.

192. PARTON, *supra* note 70, at 21.

193. *Who Invented Sewing-Machines?*, *supra* note 113, at 471.

194. See *infra* notes 281–282 and accompanying text.

Howe had not yet manufactured a single sewing machine, but he was one of the most financially successful patentees out of the hundreds of patents issued on sewing machines by that time.¹⁹⁵

It was perhaps understandable that the other patent owners perceived this non-manufacturing patentee—the inimitable “patent troll”—to be flourishing while their attempts at manufacturing actual sewing machines were floundering. They likely attributed the key to Howe’s success, however slight by the mid-1850s, to his apparent disavowal of manufacturing and his pursuit of royalties as his sole source of profit. This was more historical accident than careful strategic business planning on Howe’s part,¹⁹⁶ but that is not how they probably saw it. Of course, as a result of the sewing machine’s provenance, as one mid-nineteenth-century book remarked, “it is now utterly impossible to make a sewing machine of any kind of any practical utility without directly infringing several subsisting patents, the validity of which cannot be questioned.”¹⁹⁷ The result was a flurry of lawsuits as these myriad patent owners, such as I.M. Singer & Co., Lerow & Blodgett, and Wilson, Wheeler & Co., among others, attempted to claim their rightful slice of the royalty pie. In so doing, they created the first American patent thicket.

III. THE FIRST AMERICAN PATENT POOL: THE SEWING MACHINE COMBINATION

By the mid-1850s, sewing machine firms were spending all of their time, money, and energy in patent litigation, and as a result the sewing machine was languishing as a commercial product. The situation demanded a solution, and this solution came from an unlikely source: an attorney, Orlando B. Potter, who was heavily involved in the Sewing Machine War representing a prominent sewing machine manufacturer, Grover & Baker, of which he was also president. Potter’s solution was groundbreaking, but also breathtakingly simple: the relevant patent owners should combine their patents into a patent pool that would be administered as a commercial trust.

The opportunity for Potter to present his idea to the warring parties arose in October 1856, when by chance most of the principal sewing machine patentees and firms were in Albany, New York for the first trial being held among the litany of lawsuits that had been filed since 1854. In a meeting held shortly before the trial began, Potter floated his proposal that Howe, I.M. Singer & Co., Grover & Baker,

195. See *The Sewing Machine Business as It Is Compared with What It Was Ten Years Ago*, 7 SCI. AM. 105, 105 (1862) (“Since the first sewing machine was illustrated in our columns up to the first of July last—embracing a period of thirteen years—358 American patents have been granted for improvements upon it direct and for devices connected with its use.”); see also Bourne, *supra* note 78, at 533 (reporting that there were seventy total patents on sewing machines by 1855 and 843 patents on sewing machines by 1867).

196. See *supra* notes 71–75 and accompanying text (discussing Howe’s failed attempts at commercializing his patent).

197. HENRY HOWE, ADVENTURES AND ACHIEVEMENTS OF AMERICANS 159 (Cincinnati, Henry Howe 1859).

and Wheeler, Wilson & Co. should combine their patents.¹⁹⁸ This proposal made sense because, by 1856, these four parties owned the patents that covered the core elements of the fully practical sewing machine as a commercial product. Little is known about the exact details of this fateful meeting in Albany, but it is clear that Potter proposed his “Combination” as a solution to the patent thicket that was the Sewing Machine War.

Scholars and historians recount that the three manufacturers agreed to Potter’s plan to create the Sewing Machine Combination.¹⁹⁹ Howe initially opposed it, however, and given the fundamental status of his 1846 patent in the sewing machine industry, the patent pool could not work without Howe’s participation.²⁰⁰ Howe’s opposition was understandable: the manufacturers made their money by producing sewing machines, and thus they would profit from a patent pool that freed them to manufacture and sell their products. But Howe was a non-practicing entity who made his money through licensing fees, which he was garnering through threatened and actual injunctions. The three firms convinced Howe to join the patent pool by providing him with special concessions, which included a special royalty of \$5 for each sewing machine sold in the United States and \$1 for each sewing machine exported to foreign markets.²⁰¹ Most important, Howe wrung a third concession from the other three firms that the Sewing Machine Combination would have no less than twenty-four licensees, which ensured a steady income stream for Howe from his special royalties on sales of sewing machines by these licensees. With these special terms, Howe agreed to join the Combination.

The Sewing Machine Combination²⁰² functioned as a classic patent pool. As with modern patent pools, its four members were free to compete with each other in the sewing machine market, but they issued cross-licenses to each other in the use of their respective patents.²⁰³ Each member paid a \$15 license fee for each sewing machine they produced. This fee was distributed among the four members of the Combination as follows: a small portion was put into a war chest to cover expenses for future lawsuits involving any of the Combination’s patents, Howe then received his special royalty payment, and the remaining monies were apportioned among all four members.²⁰⁴ In 1860, the Combination reduced this fee from \$15 to \$7, and Howe’s royalty was reduced to \$1 for all sewing machines.²⁰⁵

198. See BISSELL, *supra* note 4, at 85–86.

199. See *id.*; BRANDON, *supra* note 1, at 98; COOPER, *supra* note 47, at 41.

200. See BISSELL, *supra* note 4, at 85–86.

201. COOPER, *supra* note 47, at 41.

202. It was also referred to as the “Albany Agreement of 24 October 1856.” BISSELL, *supra* note 4, at 87.

203. The most important patents were those issued to Howe, Bachelder, Wilson, and Singer. By 1856, Singer had purchased Bachelder’s patents, and thus Singer contributed these to the Combination. COOPER, *supra* note 47, at 41–42.

204. *Id.* at 42.

205. *Id.*

Yet the Combination was more than just a patent pool, it was also a trust.²⁰⁶ The consent of all four members of the Combination was required for licensing its patents; in practice, though, this collective consent was granted as a matter of course with the exception of license applicants who sought simply to copy one of the Combination member firm's own sewing machines.²⁰⁷ Unfortunately, the Combination's records were lost in a fire,²⁰⁸ but a few surviving remnants show that member and non-member firms received licenses for producing hundreds of thousands of sewing machines.²⁰⁹ As the head of the Combination, Potter also became the plaintiff in the numerous future infringement lawsuits concerning the Combination's patents.²¹⁰ Lastly, the Combination's rules did not expressly require or promote price collusion among its members, but it was alleged to have occurred, which is unsurprising.²¹¹

Potter's commercial brainchild was a tremendous success, as the Combination made it possible for the sewing machine manufacturers to start making and selling sewing machines, rather than working full-time on suing each other out of existence. Of course, the Combination was required to continue to litigate in defense of its patent rights, and such lawsuits were as lengthy, complex, and costly as those that occurred during the Sewing Machine War.²¹² As Circuit

206. See *Potter v. Wilson*, 19 F. Cas. 1193, 1196 (C.C.S.D.N.Y. 1860) (No. 11,342) (rejecting defendants' argument to dismiss complaint by the captioned plaintiffs because "the patents are held by them as trustees of these companies").

207. See *COOPER*, *supra* note 47, at 42.

208. *Bourne*, *supra* note 78, at 530.

209. *COOPER*, *supra* note 47, at 40.

210. See, e.g., *Potter v. Braunsdorf*, 19 F. Cas. 1132 (C.C.S.D.N.Y. 1869) (No. 11,321); *Potter v. Mack*, 19 F. Cas. 1166 (C.C.N.D. Ohio 1868) (No. 11,331); *Potter v. Empire Sewing Mach. Co.*, 19 F. Cas. 1147 (C.C.S.D.N.Y. 1868) (No. 11,326); *Potter v. Whitney*, 19 F. Cas. 1191 (C.C.D. Mass. 1866) (No. 11,341); *Potter v. Schenck*, 19 F. Cas. 1182 (C.C.N.D. Ill. 1866) (No. 11,337); *Potter v. Muller*, 19 F. Cas. 1168 (C.C.S.D. Ohio 1865) (No. 11,333); *Potter v. Muller*, 19 F. Cas. 1170 (C.C.D. Ohio 1864) (No. 11,334); *Potter v. Dixon*, 19 F. Cas. 1145 (C.C.S.D.N.Y. 1863) (No. 11,325); *Potter v. Fuller*, 19 F. Cas. 1148 (C.C.S.D.N.Y. 1862) (No. 11,327); *Potter v. Stevens*, 19 F. Cas. 1184 (C.C.S.D.N.Y. 1861) (No. 11,338); *Potter v. Holland*, 19 F. Cas. 1160 (C.C.D. Conn. 1858) (No. 11,330); *Potter v. Holland*, 19 F. Cas. 1154 (C.C.D. Conn. 1858) (No. 11,329); *Potter v. Hicks*, 19 F. Cas. 1154 (C.C.E.D. Pa. 1858) (No. 11,328).

211. See *BISSELL*, *supra* note 4, at 87 (noting that "evidence abounds that indicates these main players also cooperated in price fixing and in other mutually beneficial policies").

212. See, e.g., *Empire Sewing Mach. Co.*, 19 F. Cas. at 1147 (observing that the patents at issue "have heretofore been frequently before this court . . . and have been the subject of laborious and exhaustive investigation, both by counsel and court"); *Fuller*, 19 F. Cas. at 1149 (noting how in earlier hearings concerning plaintiffs' request for preliminary injunctions, "[l]ong and elaborate arguments were had, and the court, after full deliberation, overruled all of said objections"); *Muller*, 19 F. Cas. at 1171 (recognizing that the plaintiff's patent was validated in three earlier lawsuits, in one of which "there was a very protracted and laborious trial, with full argument on both sides by counsel of eminent ability"); *Stevens*, 19 F. Cas. at 1185 (recognizing that there has already been "a large amount of severely contested litigation in relation to the right of the assignees of Wilson, as the first inventor, had been had in the state of Connecticut, and in the Southern [D]istrict of New York, and adjudications sustaining their rights").

Justice Nelson remarked in one 1868 patent case (in which Potter was the lead plaintiff): “Indeed, there have been but few patents that have come before me or under my observation which have been more zealously or perseveringly contested; and yet, so far as appears, or I know, their validity in every instance has been maintained.”²¹³ Despite this continuing litigiousness, the principal sewing machine patents were now under one commercial umbrella, and thus there was in fact substantially less litigation. Furthermore, injunctions and damages were now obtained against real infringers selling copycat sewing machines in the marketplace.²¹⁴

The Sewing Machine Combination was also vehemently attacked in court and in the popular press as a “grinding, pitiless monopoly.”²¹⁵ Indeed, infringers counterclaimed in their lawsuits that the Combination’s war chest represented “oppressive conduct,”²¹⁶ but in the days before antitrust law such arguments fell on deaf ears in the courts.²¹⁷ However, newspapers and other media outlets, which earlier delighted in reporting on the details of the Sewing Machine War, were just as eager to report on or to issue such criticisms themselves. Given the far-reaching success of the Sewing Machine Combination as a commercial trust, it proved to be a lightning rod for populist-style criticism. In 1860, a letter to the *New York Times*, signed “Seamstress,” declared that “it is the duty of all to aid in putting down such combined monopolies.”²¹⁸ Foreshadowing the charges that would soon be leveled at John D. Rockefeller’s even more famous Standard Oil Trust, Horace Greeley’s *Daily Tribune* railed against the Sewing Machine Combination as a “most odious monopoly.”²¹⁹

As the first patent pool, there were also complaints about the patent rights that constituted the unique legal content of this particular commercial trust. An anonymous nineteenth-century “correspondent” to the *Philadelphia Enquirer*

213. *Empire Sewing Mach. Co.*, 19 F. Cas. at 1147.

214. *See, e.g., United States Circuit Court—Feb. 15, Before Judge Ingersoll, Injunctions in the Sewing Machine Case*, N.Y. TIMES, Feb. 16, 1859, at 8 (“After argument Judge Ingersoll decided that the injunctions should issue against all [the defendants in fifteen cases], leaving the defendants to move to dissolve them if they saw fit.”).

215. *The Sewing Machine Monopoly*, 28 SCI. AM. 145, 145 (1873) (containing the letter of Sarah S. Thomas to the editor); *see also infra* note 219 and accompanying text.

216. *Fuller*, 19 F. Cas. at 1151.

217. *See id.* (“[W]hy they might not make a common fund for the purpose of protecting their common rights by prosecuting those they thought had infringed them, I am at a loss to conceive.”); Bourne, *supra* note 78, at 531 (“From the beginning to the end of the combination there was an army of would-be infringers and imitators who kept up a constant howl on any and all occasions, claiming that the existence of the combination tended to retard the improvement of the sewing-machine, and that the public were the sufferers thereby.”); *see also infra* note 292 (discussing how antitrust influences the problem of patent thickets today).

218. Seamstress, *supra* note 191.

219. BRANDON, *supra* note 1, at 99 (quoting undated *Tribune* editorial). Brandon thus identifies the Sewing Machine Combination as one of the nineteenth-century commercial practices that precipitated the enactment of the Sherman Antitrust Act. *Id.* at 98 (“The Anti-Trust Division of the United States Department of Justice was formed very largely to deal with the fruits of Mr. Potter’s brainwave [in creating the Combination].”).

complained that the firms in the Sewing Machine Combination charged “ruinous” prices and that they used a “number of lobbyists” to obtain improper extensions of their patents.²²⁰ In 1870, a “correspondent of the [*New York Sun*]” complained about how the “sewing-machine combination were endeavoring to secure the extension of the Bachelder patent.”²²¹ This anonymous writer called Bachelder “a catspaw, poor devil,” but he reserved special scorn for the Patent Office, which he called a “shaving shop, a flunkey’s office, where evidence is prepared and manufactured regardless of truth, for the benefit of a few monopolists who want their patents extended from time to time.”²²² Such criticisms must have been common, because a hagiographic history of the sewing machine’s inventors and manufacturers, published in 1872, felt it necessary to point out that “terrible things are uttered [about the Sewing Machine Combination] by the surreptitious makers of sewing machines.”²²³

Despite these attacks, the Sewing Machine Combination did serve an important function in resolving the Sewing Machine War and freeing the sewing machine manufacturers to get down to the business of making and selling sewing machines. This was especially true with respect to Singer, who found motivation for his business acumen in “the dimes, not the invention.”²²⁴ Singer recognized very early on that the success of the sewing machine was predicated on his convincing the public that his new sewing machine was not merely a repeat of the past failures of prior inventors. He thus pioneered mass marketing and advertising, which, at that time, represented an entirely “new concept of selling.”²²⁵ This entailed a concerted and sustained marketing campaign directed to bringing his sewing machine to the public’s attention and to convincing them of its practical virtues. He traveled the country, giving free demonstrations at fairs, carnivals, and in rented halls.²²⁶ In addition to these free demonstrations, he performed renditions of Thomas Hood’s *Song of the Shirt*,²²⁷ reminding his audiences of the toils from which seamstresses would be freed by his new invention.

But Singer also recognized that he had to do more than just sell the public on the practicality of his sewing machine, he also had to address the prejudice that

220. *The Sewing Machine Monopoly*, 36 SCI. AM. 277, 277 (1877) (quoting from a “correspondent of the *Philadelphia Enquirer*”).

221. *See A Sewing Machine-Patent Extension—An Irate Opponent*, 23 SCI. AM. 41, 41 (1870).

222. *Id.* *Scientific American*, which republished these remarks, agreed and disagreed with the writer. It noted that the application for an extension of the Bachelder patent was:

an unjust measure, not intended to benefit the inventor, but to perpetuate and enrich a combination which seeks to control the entire sewing machine interest of this country. We suggest, however, that abuse of the Commissioner of Patents, the Patent Office, and the inventor, is not the way to defeat the measure.

Id.

223. PARTON, *supra* note 70, at 23.

224. BRANDON, *supra* note 1, at 93.

225. COOPER, *supra* note 47, at 34.

226. *Id.*; *see also* BRANDON, *supra* note 1, at 73; EVANS, *supra* note 4, at 89.

227. *See supra* note 41 and accompanying text.

women were incapable of working machinery, or, if they could, that it was improper and unwomanly for them to do so.²²⁸ Driven by his own pursuit of fortune, and thus setting aside his own personal bigotry,²²⁹ Singer hired women to demonstrate his sewing machine, as well as teach other women how to use it. One of I.M. Singer & Co.'s first employees was Augusta Eliza Brown, who was hired in 1852 solely for these purposes.²³⁰ Such



demonstrations not only disproved the widespread belief that women could not work machines, they also played an important role in Singer's new concept of splashy, eye-catching marketing. Singer's lawyer and business partner, Edward Clark,²³¹ wrote to a company agent in 1852 that "we have got possession of a front window under our office [in Boston] at the moderate rent of one thousand dollars a year, and a nice little girl is operating a machine in it, to the great entertainment of the crowd."²³²

In addition to such innovative marketing campaigns, Singer and Clark also pioneered novel business practices to increase their company's sales and profits. A significant barrier to the widespread adoption and use of the Singer Sewing Machine was its price: it cost \$125, which may not seem like much today, but in the 1850s, the average American family earned less than \$500 per year.²³³ In response to this problem, Clark invented a new business method for selling their sewing machines: the installment-purchase program (known in common parlance as rent-to-own). The company's newspaper, the *I.M. Singer & Co. Gazette*, explained the purpose of Clark's rent-to-own sales program:

Why not rent a sewing machine to the housewife and apply the rental fee to the purchase price of the machine? Her husband cannot accuse her of running him into debt since he is merely hiring or renting the machine and under no obligation to buy. Yet at the end of the period of the lease, he will own a sewing machine for the money.²³⁴

This was the first such installment-purchase program in American history, and it was a brilliant solution to the price problem in selling Singer Sewing

228. The problem presented by this prejudice to the commercial success of the sewing machine is discussed in some detail in BRANDON, *supra* note 1, at 120–27.

229. See *supra* note 187 and accompanying text.

230. BRANDON, *supra* note 1, at 124.

231. See *supra* note 127 and accompanying text.

232. BRANDON, *supra* note 1, at 125. This illustration of a woman using a sewing machine was first published by I.M. Singer & Co. in 1853, reproduced as Plate 7 in FREDERICK L LEWTON, *THE SERVANT IN THE HOUSE: A BRIEF HISTORY OF THE SEWING MACHINE* (1930), available at <http://www.sil.si.edu/digitalcollections/hst/lewtan/high/index.htm> (last visited Jan. 27, 2011).

233. BRANDON, *supra* note 1, at 116.

234. *Id.* at 117.

Machines.²³⁵ In combination with Singer's novel marketing schemes, this program should have had a tremendous impact on I.M. Singer & Co.'s bottom line. It did indeed have an impact, tripling the sales of Singer Sewing Machines from 1855 to 1856, but such successes were tempered by the massive expenses imposed on the company by the then-raging Sewing Machine War. In fact, sales of Singer Sewing Machines were dismal from 1853 to 1855,²³⁶ which, in comparison to the explosion in its sales following the formation of the Sewing Machine Combination in 1856, is perhaps a result of the uncertainty surrounding the Singer Sewing Machine caused by the legal dispute between Singer and Howe, and then the start of the full-scale Sewing Machine War in 1854.

Following Potter's creation of the Sewing Machine Combination in November 1856, Singer and Clark's innovative efforts at commercializing their patented invention began to realize their full potential. The year after the Combination was created, Clark invented another new business method to further secure I.M. Singer & Co.'s place in the soon-to-be exploding sewing machine market: he conceived of a trade-in plan in which I.M. Singer & Co. would accept any older version of a Singer Sewing Machine, or any competitor's sewing machine, in exchange for a \$50 credit toward a new Singer Sewing Machine.²³⁷ Again, this was a brilliant marketing stratagem, as it killed two birds with one stone for I.M. Singer & Co. First, it reduced the price of a new sewing machine, increasing overnight the number of purchasing consumers (and revealing an implicit understanding of elasticity of demand on the part of Clark). Second, it effectively prevented the rise of a second-hand market for used sewing machines that would compete with sales of new sewing machines.²³⁸

Singer and Clark's innovation in both creating a sewing machine market and securing their company's place as the dominant firm within this new market is a palpable example of the commercialization benefits secured by property rights in patented inventions. With the end of the Sewing Machine War and the formation of the Sewing Machine Combination in 1856, the sewing machine manufacturers immediately began reaping the fruits of their labors. Despite the Panic of 1857 (a severe economic recession), the members of the Combination flourished, especially Wheeler, Wilson & Co., whose sales more than tripled between 1856 and 1858.²³⁹ And, despite the tremendous economic and political tumult of the Civil War, sewing machine manufacturers continued to experience tremendous sales growth, in part because their machines were helping to clothe Union

235. In dealing with a the same pricing problem, Cyrus McCormick came up with a similar idea some years earlier in convincing farmers to purchase his new mechanical reaper, but he created only an installment-purchase program in which farmers would make two payments: one small payment before the harvest (\$30) and a larger final payment after the harvest (approximately \$100). See EVANS, *supra* note 4, at 82–83. Thus, McCormick's idea, while a novel conception in short-term credit, was not a rent-to-own sales program.

236. I.M. Singer & Co.'s sales figures for these three years were as follows: 1853 (810), 1854 (879), and 1855 (883). COOPER, *supra* note 47, at 40.

237. BRANDON, *supra* note 1, at 118–19.

238. *Id.* at 119.

239. COOPER, *supra* note 47, at 40.

soldiers.²⁴⁰ During the war, I.M. Singer & Co., which was renamed the Singer Manufacturing Company in 1863,²⁴¹ watched its sales grow each year from approximately 13,000 machines in 1860 to 23,632 in 1864.²⁴²

As a result of its constant focus on innovation, made possible by its patented inventions and its participation in the Sewing Machine Combination, the Singer Manufacturing Company eventually overtook Wheeler, Wilson & Co. in 1867 as the top-selling sewing machine firm.²⁴³ In fact, there is circumstantial evidence that its innovative marketing campaigns and business practices were an important source of its commercial successes, as I.M. Singer & Co. did not adopt the innovative machine-tooled, interchangeable-parts manufacturing process in the 1850s as did its competitors, Wilcox & Gibbs and Wheeler, Wilson & Co.²⁴⁴ Although these other manufacturers “identified their production system . . . as the source of their success,”²⁴⁵ Singer saw differently, claiming that “a large part of our own success we attribute to our numerous advertisements and publications. To insure success only two things are required: 1st to have the best machines and 2nd to let the public know it.”²⁴⁶ The historical facts confirm this claim.²⁴⁷ By 1876, the Sewing Machine Combination’s records reveal that the Singer Manufacturing Co. sold 262,316 sewing machines, more than double that of its closest competition, Wheeler, Wilson & Co., which sold 108,997 machines that year.²⁴⁸ When the Sewing Machine Combination terminated in 1877, the Singer Manufacturing Company’s sales accounted for more than half of the total sales of sewing

240. See EWERS & BAYLOR, *supra* note 2, at 39–42.

241. After forming their business partnership in 1851, *see supra* note 127, Clark and Singer worked very well together until 1860, when a public scandal erupted after one of Singer’s wives, Mary Sponsler, discovered Singer with one of his other wives, Mary McGonigal, in the middle of Fifth Avenue in New York City. Following this confrontation, Singer nearly choked Mary Sponsler to death, and he then fled to Europe for a brief respite from the public uproar. He eventually returned in 1863 to marry another woman, Isabella Boyer. Clark was of high birth and he could not abide by such behavior. Following Singer’s return in 1863, they formally dissolved the I.M. Singer & Co. partnership. Clark then incorporated the Singer Manufacturing Company, with Clark in control of the company and its assets and Singer receiving guaranteed income from his ownership of 40% of the stock. *See EVANS, supra* note 4, at 86, 91.

242. See COOPER, *supra* note 47, at 40.

243. *See id.*

244. See HOUNSHELL, *supra* note 1, at 68. Wheeler, Wilson & Co. was one of the first sewing machine companies to adopt the “American system” of manufacturing products with machine-tooled, interchangeable parts. *See id.* at 73–74. This explains in part why it took an early lead over its rivals in the sewing machine market; the Singer Manufacturing Company, for example, did not adopt this new manufacturing process until the 1860s. *See id.* at 90–91.

245. *Id.* at 85.

246. *Id.*

247. *Id.* at 93 (“The widening of domestic and international markets, coupled with intensification of advertising and other marketing techniques, brought about a rapid increase in sales of Singer’s products.”).

248. COOPER, *supra* note 47, at 40.

machines, and the company controlled 75% of the world market for sewing machines.²⁴⁹

Contrary to its humdrum reputation today, the sewing machine was identified repeatedly in the nineteenth century as one of the “epoch-making inventions of America,” receiving this accolade at none other than the centennial celebration of the American patent system in Washington, D.C., in 1891.²⁵⁰ In separate remarks at the centennial celebration, Senator Orville H. Platt included the sewing machine in a list of “the seven wonders of American invention.”²⁵¹ Another participant at the centennial waxed poetic that the sewing machine “emancipated human fingers from the most monotonous, wearisome and slavish of all forms of labor.”²⁵² In addition to “usher[ing] in an epoch of cheap clothes,” it was observed that the “invasion of all occupations by women, and the sweeping changes which have been taking place in their relations to the law, and society, and business, can be ascribed in large measure to the sewing machine.”²⁵³ This was not hyperbole, as attested to by Singer’s successful and innovative efforts at commercializing the sewing machine—a productiveness unleashed by the freedom secured by the Sewing Machine Combination. Singer may have been only chasing after “dimes,”²⁵⁴ and he was certainly a chauvinistic, abusive bigot,²⁵⁵ but it was his business acumen that challenged longstanding cultural norms about the mechanical capabilities of women.

In sum, Singer and Clark’s commercial innovation, made possible by Singer’s patented improvements to the sewing machine, not only ensured the success of the Singer Manufacturing Company, it was largely responsible for the success of the American sewing machine industry writ large. At root, such successes were made possible by the legal and commercial freedom to innovate secured to Singer and Clark by the Sewing Machine Combination. By all accounts, Singer’s company was the most successful sewing machine company, and it justifiably served as the public face of the Sewing Machine Combination.²⁵⁶

249. See BISSELL, *supra* note 4, at 88.

250. Hon. Robert S. Taylor, *The Epoch-Making Inventions of America*, in PROCEEDINGS AND ADDRESSES: CELEBRATION OF THE BEGINNING OF THE SECOND CENTURY OF THE AMERICAN PATENT SYSTEM 121, 122–23 (Donald W. Banner ed. reissue, 1990) (1892) [hereinafter PROCEEDINGS AND ADDRESSES]; see also Lester L. Bond, *On Epoch-Making Inventions*, in 1 PATENT LAW ASSOCIATION: JOURNAL AND PROCEEDINGS, 1884–1900, at 170–71 (1900) (identifying again the sewing machine as one of the epoch-making inventions in a paper presented to the Patent Law Association in 1894).

251. Hon. O.H. Platt, *Invention and Advancement*, in PROCEEDINGS AND ADDRESSES, *supra* note 250, at 57, 71. The full list included: the cotton-gin, the use of steam engines for transportation, the use of electricity in commercial endeavors, the harvester, the modern printing press, the ocean cable, and the sewing machine. *Id.*

252. Taylor, *supra* note 250, at 122.

253. *Id.* at 122–23.

254. BRANDON, *supra* note 1, at 93 (quoting Singer’s famous claim that he was interested only in “the dimes, not the invention”).

255. See *supra* notes 88, 187, 241 and accompanying text.

256. See BRANDON, *supra* note 1, at 111.

IV. SOME CONCLUDING THOUGHTS ON PATENT THICKETS AND RELATED POLICY CONCERNS

The story of the sewing machine—its incremental invention, the Sewing Machine War, and its ultimate commercial success after the creation of the Sewing Machine Combination—is an important empirical case study of patent thickets. What makes this story so salient to legal scholars today is that the Sewing Machine War comprises so many issues that are currently in play in modern patent policy debates, such as “patent trolls” (i.e., non-practicing entities), the function of injunctions in patent litigation, hold-ups, and, of course, the existence of patent thickets. It may be only one illustration of a patent thicket and its attendant concerns, but it is an extremely robust case study, and as such it exposes some of the ways in which contemporary patent thicket theory has become impoverished by its own underlying assumptions.

First, and most generally, this historical patent thicket challenges the principal focus of the patent thicket literature on modern inventions and recent changes in patent law, such as the rise of biotech patenting since 1981.²⁵⁷ This has led to an assumption, sometimes expressed explicitly by scholars like Heller, that this is primarily a modern problem.²⁵⁸ But this has only undercut patent thicket theory by unduly narrowing its empirical verification, depriving it of significant case studies from well-documented historical patent thickets. In fact, given the cutting-edge nature of biotech research and its equally innovative commercialization, this new field presents a quickly moving empirical target.²⁵⁹ This may explain why recently published studies on patent thickets, at best, have found none, or, at worst, have been inconclusive.²⁶⁰ Broadening the empirical inquiry can do much to provide the necessary facts by which scholars may confirm or deny whether Heller’s anticommons theory applies to patents, or at least can begin to discuss with actual data—as opposed to debates over abstract theoretical or economic models—how it applies and what might be the viable real-world solutions.

Scholars may not have mined the Sewing Machine War as a resource for understanding patent thickets because they may not think this legal conflict qualifies as a patent thicket.²⁶¹ By the early 1850s, there were separate, complementary patents that covered the sewing machine, but by 1856 these patents were in the hands of four parties (Howe and three corporations). According to

257. See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (holding that genetically engineered bacteria is patentable subject matter); ROBERT P. MERGES & JOHN F. DUFFY, *PATENT LAW AND POLICY* 77 (4th ed. 2007) (noting that *Chakrabarty* was “extremely important for the then-nascent biotechnology industry because it established that the fruits of the industry’s research . . . would be eligible for patenting”).

258. See *supra* notes 18–22 and accompanying text.

259. See Mossoff, *supra* note 31, at 726–36 (detailing the many ways in which innovation, particularly in the biotech and high-tech industries, has proven unpredictable).

260. See *supra* note 12 and accompanying text.

261. This point was raised by numerous people at the workshop presentations of early drafts of this Article. I thank these participants, who are too many to name, because this has resulted in my adding the following paragraphs to address this issue.

anticommons theory, it sounds as if transaction costs were not so exorbitantly high that they frustrated the ability of these four parties to commercialize their property rights.²⁶² In fact, this limited set of parties suggests the exact opposite: the total transaction costs were quite low, which is why a private-ordering response was a viable solution to the Sewing Machine War. The formation of the Sewing Machine Combination seems to confirm anticommons theory, but only because it seems like the original dispute was not a patent thicket.

This all-too-easy dismissal of the Sewing Machine War as a patent thicket reveals the degree to which modern patent thicket theory has self-imposed empirical blinders. It assumes that the conditions of our high-tech era are a necessary feature of the inventive and commercial context for creating a patent thicket. In a modern age defined by computer-based word processing, telephones, faxes, email, Internet-based research (especially of patents), and myriad other high-tech forms of communication and commercial transaction, four owners of patents on complementary features of a commercial product hardly constitutes “a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology.”²⁶³

But there was no such transaction-cost-reducing technology in the 1850s. Howe *personally* had to visit Singer to make his royalty demands, risking his life and limb to be on the receiving end of Singer’s infamous temper (and he did so *twice*).²⁶⁴ Today, Howe would not be threatened in person to be thrown down the stairs,²⁶⁵ rather he would receive a hotly worded email or a letter drafted on a word processor and mailed by FedEx. Moreover, it was only the fortuitous gathering of the four patent owners in 1856 on the eve of the trial in upstate New York that permitted Potter to make his proposal for the Sewing Machine Combination. No such in-person gatherings are required today for innovators like Potter to propose such business ventures—or to negotiate them, as any transactional attorney can attest.²⁶⁶

In this way, the Sewing Machine War is significant, not just because it is a patent thicket, but because it highlights an often-overlooked aspect of patent thickets: they are contextual, depending on such things as time, available technology, and even commercial or legal norms. Contrary to the definition of patent thickets that dominates the literature today,²⁶⁷ this phenomenon is not

262. See *supra* notes 7–10 and accompanying text (noting how the literature repeatedly refers to density of separately owned patents and a high number of transactions as essential features of a “patent thicket”).

263. Shapiro, *supra* note 7, at 120.

264. See *supra* notes 122–125 and accompanying text.

265. See *supra* note 123 and accompanying text.

266. See, e.g., F. Scott Kieff, *On Coordinating Transactions in Intellectual Property: A Response to Smith’s Delineating Entitlements in Information*, 117 YALE L.J. POCKET PART 101, 108 (2007) (“The typical laptop computer represents a bundle of thousands of patent and other IP permissions, yet the negotiation to buy one takes only a few clicks of a mouse and costs as little as \$1,000, if not less.”).

267. See, e.g., Shapiro, *supra* note 7, at 120 (defining a patent thicket as “a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology”); Heller & Eisenberg, *supra* note 10, at

defined solely by the number of patents. The Sewing Machine War makes clear that patent thickets are also defined by, among other things,²⁶⁸ the capabilities and costs of communication between the relevant parties and the means and costs in commercially exploiting the technology. Today, for instance, the ease of communication and of negotiation of commercial deals between the relevant patent owners ups the ante on the number of parties necessary to frustrate its ultimate commercial resolution into the thousands. Flash forward 150 years—the equivalent of the time span between the Sewing Machine War and today—and patent thickets may require tens of millions of patents, and scholars at that future date may scoff at the notion of a mere couple thousand patents frustrating a commercial deal.

A heightened sensitivity to this historical context also highlights another potential cautionary tale that the Sewing Machine War provides for the patent thicket debates: it suggests that incremental invention of complementary elements of new technology is a ubiquitous feature of the cutting-edge discoveries secured in the patent system. From the sewing machine to automobiles²⁶⁹ to airplanes²⁷⁰ to radios,²⁷¹ incremental innovation is omnipresent in the historical evolution of science and technology. There was even incremental innovation in the invention of the incandescent light bulb, which, contrary to popular myth, was not discovered by Thomas Edison. Just as Isaac Singer invented only the final few elements of a practical and successful sewing machine, patent lawyers all know today that Edison invented only the first *practical* incandescent light bulb. In fact, Edison was even sued for patent infringement by one of the earlier inventors of the light

698 (“Patents and other forms of intellectual property protection . . . can go astray when too many owners hold rights in previous discoveries that constitute obstacles to further research.”); Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1174–75 (1999) (claiming that “the proliferation of intellectual property rights in upstream research may be stifling life-saving innovations further downstream in the course of research and product development”).

268. Other factors that play an important role in patent thickets are the nature of the owners of the legal “property” interests, and the operative norms of trade professions, culture, politics, and law. See Epstein & Kuhlik, *supra* note 25, at 54–56 (critiquing Heller’s reliance on the “permit power” of state bureaucrats in the post-Soviet Russian economy as a primary example of an anticommons); Kieff, *supra* note 266, at 107 (“More recent work claiming an anticommons problem for patents mistakenly stresses this fragmentation of interest—that is, how many different people have a say over an asset’s use—as the key to the anticommons effect. More important than the number of people who have a say, however, is the type of people with a say and the type of say they have.”).

269. See WILLIAM GREENLEAF, *MONOPOLY ON WHEELS: HENRY FORD AND THE SELDEN AUTOMOBILE PATENT* 244–47 (1961) (describing the automobile patent pools in the early twentieth century); FLOYD L. VAUGHAN, *THE UNITED STATES PATENT SYSTEM: LEGAL AND ECONOMIC CONFLICTS IN AMERICAN PATENT HISTORY* 62–67 (1956) (discussing automobile and airplane patent pools).

270. See George Bittlingmayer, *Property Rights, Progress, and the Aircraft Patent Agreement*, 31 J.L. & ECON. 227 (1988) (analyzing the airplane patent pools).

271. See Ted Sabety, *Nanotechnology Innovation and the Patent Thicket: Which IP Policies Promote Growth?*, 15 ALB. L.J. SCI. & TECH. 477 (2005) (discussing a patent thicket in the radio industry in the 1920s and comparing it to modern nanotech development).

bulb.²⁷² Unlike Singer's hapless luck with Walter Hunt, however, Edison was able to invalidate this earlier patent under one of the statutory requirements for a valid patent grant.²⁷³ Yet, decades later, the inventive cycle repeated itself again, as Edison was again embroiled in controversy, but this time it was with Nikola Tesla, who successfully patented and commercialized follow-on electrical inventions to Edison's own cutting-edge work in electrical power systems.²⁷⁴

Heller and other scholars have given passing acknowledgements to a few of these historical examples of incremental innovation and resulting patent thickets,²⁷⁵ but only in the service of advancing their proposed public-ordering solutions. In *The Gridlock Economy*, for instance, the only historical patent thicket to which Heller devotes anything more than a sentence or two is the airplane patent thicket, which was also a patent thicket that was solved through a public-ordering mechanism—a compulsory patent pool imposed on the patent owners by federal legislation.²⁷⁶ In fact, Heller devotes more time to discussing this legislatively coerced solution to the airplane patent thicket than to the nature of the patent thicket itself.²⁷⁷ Again, the underlying assumption is that patent thickets are a relatively modern problem to which a public-ordering regulatory model is the best, if not only, solution. In contrast to the widely accepted picture of difficult property owners who hold out today against all entreaties, requiring some type of public-ordering response from Congress, the courts, or the Patent and Trademark Office, the Sewing Machine Combination confirms that voluntary, privately formed patent pools are not just theoretically possible, but have long occurred in the real world.

Of course, sometimes a *single* patent owner is the source of all the trouble—the hold-up who refuses to license a necessary element in a technological product unless he is paid exorbitant royalties that far exceed the economic contribution of his patented invention. Such hold-ups today are typically non-practicing entities, i.e., a patent owner who is not actively commercializing his own intellectual property. In the policy debates, they are referred to as nefarious “patent trolls,” a term that has proven exceedingly difficult to define with precision.²⁷⁸ The debates over patent trolls are often intertwined with the debates

272. *Consol. Elec. Light Co. v. McKeesport Light Co.*, 159 U.S. 465 (1895).

273. *Id.* at 474–77 (applying rule that when “the description be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void”).

274. *See generally* ROBERT LOMAS, *THE MAN WHO INVENTED THE TWENTIETH CENTURY* (1999).

275. *See, e.g.*, HELLER, *supra* note 6, at 31 (“Patent thickets have threatened to strangle emerging industries ranging from sewing machines to computers.”); MILLER, *supra* note 5, at 387 (“Patent litigation plagued the airplane business from 1909, when Orville and Wilbur Wright sued Glenn Curtiss.”).

276. *See* HELLER, *supra* note 6, at 30–31.

277. *See id.*

278. *See* Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 TEX. L. REV. 961, 1023 (2005) (“[A]ny effort to design a suitable definition of the term ‘troll’ is likely to lend credence to the view that the status as a troll is in the eye of the beholder.”).

over patent thickets,²⁷⁹ and once again the Sewing Machine War does much to contribute to and challenge the basic assumptions in these debates. It reveals that “patent trolls” are not a modern phenomenon, and, perhaps even more important, it suggests that this epithet is merely empty rhetoric that does more to obfuscate than clarify the relevant facts in the policy debates.

Although the “patent troll” slur has evaded a precise definition, an oft-cited feature is that the patent owner makes money solely through royalties obtained through infringement litigation (or threats of litigation).²⁸⁰ As a non-practicing entity, the inimitable power of the “patent troll” is that he can serve as a hold-up to a firm seeking to turn an invention into commercial innovation; to wit, preventing manufacturers from moving forward with their business plans with the threat of an injunction and concomitantly demanding a royalty payment that far exceeds the value of his incremental contribution to the final commercial product.²⁸¹ If this is one of the central characteristics that define “patent troll” activity, then Howe was a “patent troll”—pioneering these tactics well over 100 years before this term was even coined.²⁸²

People may recoil at applying the “patent troll” label to Howe given his sympathetic nature as a lone and penniless inventor, but there are undeniable parallels between Howe and non-practicing entities that commentators have widely condemned as “patent trolls” today. An oft-cited example of a “patent troll” at work was in the recent BlackBerry litigation.²⁸³ In this case, the non-practicing, patent-holding company, NTP, Inc., successfully sued Research In Motion Ltd. (RIM), the manufacturer of the BlackBerry, for infringing NTP’s patents on wireless email communication. Since it was a non-practicing entity that used an injunction to compel RIM to pay for a license, NTP has been labeled as a “patent troll” by many prominent commentators, including Mark Lemley and Carl Shapiro.²⁸⁴ If NTP is a “patent troll,”²⁸⁵ then Howe certainly was one, too. By

279. See F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L. J. 327, 396 (2006) (observing that “[a]nother version of the anticommons problem for IP appears to be what some call the problem of ‘patent trolls’”).

280. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 396, 1842 (2006) (Kennedy, J., concurring) (expressing concern about how “[a]n industry has developed in which firms use patents not as a basis for producing and selling goods but, instead, primarily for obtaining licensing fees”); Miranda Jones, Note, *Permanent Injunction, A Remedy by Any Other Name is Patently Not the Same: How eBay v. MercExchange Affects the Patent Right of Non-Practicing Entities*, 14 GEO. MASON L. REV. 1035, 1040 (2007) (“Non-practicing entities (‘NPEs’) were initially identified by the oft invoked pejorative term ‘patent troll’ because few people, if any, saw any value in the actions of NPEs.”).

281. See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

282. See *supra* notes 129–134 and accompanying text (discussing how Howe obtained preliminary injunctions against sewing machine manufacturers, resulting in royalty payments on his patent for the lockstitch).

283. See *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

284. See, e.g., Lemley & Shapiro, *supra* note 281, at 2008–09 (discussing the NTP case as a “real world” example of how “so-called patent trolls [can] hold up defendants by threatening to enjoin products that are predominantly noninfringing”); Gerard N.

definition, Howe was a non-practicing entity with a patent on only a few elements of a commercial product and he used injunctions to compel licenses from actual manufacturers of the completed commercial product. Howe even compelled his own brother to pay him a royalty in manufacturing sewing machines!²⁸⁶ The shoe fits, and Howe wore it well.

Alternatively, Howe's status as a non-practicing entity perhaps can serve a better function in checking the use of "patent troll" in the policy debates. For instance, some people believe that Howe is not a patent troll because he invented the mechanism for creating the lockstitch, but many non-practicing entities today also invented the patented technology that they own, including NTP.²⁸⁷ Moreover, Howe attempted and failed to manufacture his sewing machine, and thus some believe that this also precludes him from being a "patent troll,"²⁸⁸ but the inventor and co-founder of NTP also tried and failed repeatedly to manufacture his invention.²⁸⁹ If commentators persist in condemning NTP as a "patent troll," then the rule that like things be treated alike demands by dint of logic that we also condemn Howe as a "patent troll." Then again, the parallels between Howe and NTP suggest that it is time that the "patent troll" label be laid to rest. At the end of the day, this term appears to be merely a rhetorical epithet that obscures more than illuminates the relevant facts in the patent policy debates.

Even more important for understanding patent thickets and how best to resolve them, the Supreme Court did not intercede in the Sewing Machine War, redefining Howe's legal remedies in order to make way for the commercialization

Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1809–10 (2007) (observing that the BlackBerry litigation "was brought by a 'patent troll,' which is a derogatory term for firms that use their patents to extract settlements rather than license or manufacture technology"); Bruce Sewell, *Troll Call*, WALL ST. J., Mar. 6, 2006, at A14 (criticizing NTP as a patent troll).

285. *But see* Kieff, *supra* note 279, at 395–98 (arguing that NTP is not a patent troll).

286. *See* COOPER, *supra* note 47, at 24, 41 & n.64 (observing how Amasa Howe received a license in 1853 following Elias Howe's success at enjoining "several firms from selling Singer machines while the Howe suit was pending"). Amasa testified in 1860 that he was "one of the licensees of Elias Howe, Jr." IN RE HOWE'S APPLICATION FOR A PATENT EXTENSION, *supra* note 116, at 20.

287. NTP was co-founded by the inventor of the patented wireless technology, Thomas Campana, Jr. *See* Barrie McKenna et al. *Patently Absurd*, GLOBE AND MAIL, Jan. 28, 2006, at B4.

288. Howe attempted over many years to manufacture his sewing machine, but he repeatedly met with failure. In late 1850, before his litigation against Singer and the other sewing manufacturers really took off, he did manage to manufacture fourteen sewing machines under his patent. *See* PARTON, *supra* note 70, at 17. Moreover, Howe eventually set up his own manufacturing facilities later in the 1860s, which ultimately precipitated more litigation—this time, between him and his licensee and brother, Amasa Howe, as to the use of the word "Howe" as a trademark for sewing machines. *See* *Howe v. Howe Mach. Co.*, 50 Barb. 236 (N.Y. Gen. Term 1867). Perhaps some thought that Elias Howe at last got his just deserts, because Amasa Howe won the trademark lawsuit. *Id.*

289. *See* McKenna, *supra* note 287 (discussing how Campana attempted to manufacture his patented invention but was unsuccessful, and thus NTP was formed in 1992 only after his latest firm, Telefind, went bankrupt in 1991).

of the sewing machine.²⁹⁰ The Sewing Machine Combination was successfully formed in the shadow of both the injunctive relief already obtained by Howe and the injunctions being sought by the firms engaged in the Sewing Machine War. Moreover, there was no Patent Reform Act of 1856 that prompted the formation of the Sewing Machine Combination by eliminating Howe's ability to obtain injunctions, limiting his royalty payments, or imposing restraints on his or other patentees' commercialization rights.²⁹¹ The Sewing Machine Combination was initiated by private actors for their private benefit—within the governing rules of a property system that provided strong protection to the owners of the patented technology. This suggests that it is possible for private-ordering solutions to be formed in the face of patent thickets, and that it is unnecessary to eliminate or “creatively adapt[] property rights” secured to inventors by the patent system.²⁹² For this reason, the Sewing Machine War and its resolution in the Sewing Machine Combination is an important empirical case study that teaches important lessons for understanding patent thicket theory today.

290. See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 390 (2006). This is not to say that nineteenth-century courts were of one mind with respect to issuing injunctions on a finding of patent infringement. In 1860, one court denied Howe an injunction on the basis that Howe was a non-practicing entity. See *Howe v. Morton*, 12 F. Cas. 663, 669–70 (C.C.D. Mass. 1860) (No. 6769). But this decision was an outlier, as Howe and others consistently received injunctions (and damages) in the many other lawsuits they filed against infringers. See, e.g., *Potter v. Schenck*, 19 F. Cas. 1182, 1184 (C.C.N.D. Ill. 1866) (No. 11,337) (“[I]f the defendants are using the complainants' property, they ought not to use it, either in law or in morals, without compensation and without their consent.”).

291. At the time, such measures may have been deemed to have constituted an unconstitutional taking of the sewing machine patentees' property. See generally Adam Mossoff, *Patents as Constitutional Private Property: The Historical Protection of Patents Under the Takings Clause*, 87 B.U. L. REV. 689 (2007). For a broader discussion of regulatory takings doctrine in the nineteenth century, see generally Eric R. Claeys, *Takings, Regulations, and Natural Property Rights*, 88 CORNELL L. REV. 1549 (2003).

292. See *supra* notes 23–29 and accompanying text (surveying proposals and legal decisions that propose to resolve the gridlock problem by merely limiting property rights in inventions). Antitrust complicates this picture. Antitrust further reinforces the point that the problem of patent thickets today is not necessarily endogenous to the patent system. See *supra* notes 263–267 and accompanying text. The issue of antitrust review of patent pools is complex and goes far beyond the scope of this Article, but it bears noting that inevitable antitrust lawsuits against patent pools by non-member competitors or by the government, even under the rule-of-reason standard applied since the 1990s, raises *ex ante* uncertainties and complicates the cost-benefit analysis of whether a patent pool can serve as an efficient solution to a patent thicket. See Richard J. Gilbert, *Antitrust for Patent Pools: A Century of Policy Evolution*, 2004 STAN. TECH L. REV. 3. For example, the Sewing Machine Combination's unilaterally set royalties (combined with the uniformity in prices) would likely raise antitrust hackles today. See *id.* ¶¶ 40–42. Ironically, the Singer Manufacturing Company was sanctioned in the mid-twentieth century for a patent pool with an Italian and Swiss firm that was deemed to run afoul of the antitrust laws. See *United States v. Singer Mfg. Co.*, 374 U.S. 174 (1963). Most of the proposals for dealing with patent thickets do not account for the impact that non-property doctrines like antitrust have on the patent thicket problem.

In conclusion, it bears emphasizing that the empirical merits of the Sewing Machine War and the Sewing Machine Combination must be kept within their proper bounds. At a minimum, it serves as a cautionary tale against many foundational assumptions that dominate the current discourse concerning patent thickets, such as the nature of incremental innovation, the contextual nature of patent thickets, the extent to which patents thickets are solely a property problem, the role of non-practicing entities, and the justification for public-ordering versus private-ordering solutions. This important historical patent thicket indicates that this is not solely a modern problem within the patent system, and thus we are not at the mercy of either abstract models or recent anecdotes to understand either the sources or the solutions to this problem. One should be careful not to overstate the guidance offered by such historical events, or at least one must be sensitive to the many heterogeneous factors at work in historical events dealing with the interaction of law, technology, commerce, culture, and politics.²⁹³ Hopefully,

293. One example of empirical work that may go too far in its confident assertions about the Sewing Machine Combination are studies by Ryan Lampe and Petra Moser, who claim that the Sewing Machine Combination reduced innovation among pool members in sewing machine technology. *See, e.g.*, Ryan Lampe & Petra Moser, Do Patent Pools Encourage Innovation? Evidence from the 19th-Century Sewing Machine Industry (June 8, 2010) (unpublished manuscript), available at <http://ssrn.com/abstract=1308997>. Unfortunately, they use patent counts as a measure of innovation, *see id.* at 4–5, and the problems with this approach are well known. *See* Zvi Griliches, *Patent Statistics as Economic Indicators: A Survey*, 28 J. ECON. LITERATURE 1661 (1990); Simon Kuznets, *Inventive Activity: Problems of Definition and Measurement*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 19–52 (1962). This is particularly problematic given that they are studying the patenting rates of members of the Sewing Machine Combination, the leading sewing machine firms. *See* Griliches, *supra*, at 1677 (“A well-established major firm does not depend as much on current patenting for its viability or the survival of its market position. Thus, even at equal underlying true inventiveness rates, the propensity to patent may be lower for large firms, at least relative to the successful new entrants in their field.”).

To their credit, Lampe and Moser recognize this problem, and thus they try to control for it by linking patent counts to the evolution in the speed in sewing (stitches per minute). *See* Lampe & Moser, *supra*, at 5. Assuming arguendo that this is sufficient to justify their conclusion about reduced innovation in stitching speed, this is at best a very limited insight that does not account for the overall efficiencies resulting from the dynamic and heterogeneous nature of innovation. *See* Joshua D. Wright, *Antitrust, Multi-Dimensional Competition, and Innovation: Do We Have an Antitrust Relevant Theory of Competition Now?*, in *COMPETITION POLICY AND PATENT LAW UNDER UNCERTAINTY: REGULATING INNOVATION* (Joshua D. Wright & Geoffrey Manne eds., forthcoming May 2011), available at <http://ssrn.com/abstract=1463732>; HAROLD DEMSETZ, *THE ECONOMICS OF THE BUSINESS FIRM* 137–69 (1997).

This is a significant problem with statistical studies of historical innovation, in which claims about innovation are dependent on many heterogeneous factors that are difficult to account for in a single model, such as differences in the law between today and yesteryear, contemporaneous changes in law during the event study, changes in the particular patented technology itself, broader changes in science and technology that impact the relevant technology, changes in the economy, and changes in culture and politics. *Cf.* George Selgin & John L. Turner, *Strong Steam, Weak Patents, or, the Myth of Watt’s Innovation-Blocking Monopoly, Exploded*, 54 J.L. & ECON. (forthcoming Nov. 2011), available at <http://ssrn.com/abstract=1589712>. Almost all of these factors are unaccounted for in Lampe

additional historical and other empirical studies will continue to mine these events, providing a solid foundation on which scholars and courts can confirm or deny what even Heller admits is still mostly a theory.²⁹⁴

CONCLUSION

The sewing machine represents the American patent system's first foray into securing property rights in a complex, high-tech, consumer product. The sewing machine was one of many cutting-edge inventions in the antebellum era, including the cotton gin, the reaper, and vulcanized rubber, but it was also unique even at that time. Unlike these other inventions, the sewing machine was a progenitor for many pioneering developments in technology, in law, and in commerce—from its incremental invention, to the litigation free-for-all known as the Sewing Machine War, to the formation of the first patent pool and first successful commercial trust, known as the Sewing Machine Combination. The sewing machine has been the subject of cultural and historical myth, but more importantly, it represents many novel first steps in the early American patent system's innovative approach to securing property rights in inventions.

The Sewing Machine War of the 1850s should be of particular interest to property and patent scholars who are concerned about patent thickets. The Sewing Machine War confirms that patent thickets have long existed; in fact, this first patent thicket arose within a scant sixty years of the birth of the American patent system in the Patent Act of 1790 in the First Congress. This challenges many assumptions in the patent thicket literature, such as that this is a relatively modern problem arising from modern changes in both patent law and technology. It also challenges the propensity within much of the literature to favor public-ordering regimes as solutions to patent thickets, such as new regulations, legislation, or court decisions. The formation of the Sewing Machine Combination, the first patent pool and the first commercially successful trust in the nineteenth century, reveals that patent owners have the incentives to resolve the problem of patent thickets—exercising their property and contract rights within the framework of these preexisting private-ordering regimes. The fact that the very first patent thicket in American history was resolved by the very first patent pool in American history is dramatic evidence of how private-ordering problems and private-ordering solutions go hand-in-hand between property owners.

and Moser's study. Moreover, there are many well-known efficiency-maximizing innovations of the Sewing Machine Combination that are also unaccounted for by Lampe and Moser, such as Sewing Machine Combination members' innovative adoption of the machine-tooled, interchangeable-parts manufacturing process, Singer's advertising and commercial innovation, and Singer's positive impact on the cultural norms concerning women working with machines. Thus, even if Lampe and Moser's claim about reduced innovation in stitching speed is correct, we still do not know if total innovation (and thus total social welfare) was either reduced or expanded under the Sewing Machine Combination.

294. HELLER, *supra* note 6, at 77 (observing that “the empirical studies that would prove—or disprove—our theory remain inconclusive”).