

## A STITCH IN TIME: THE RISE AND FALL OF THE SEWING MACHINE PATENT THICKET

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*Scholarly interest in how anticommons theory applies to patents has skyrocketed since Professor Michael Heller first proposed that excessively fragmented interests in land can frustrate its commercial development. There is now a vigorous debate on whether anticommons exist in patent law, and, if so, whether these “patent thickets” impede innovation in patented products. This article contributes to this debate by analyzing the rise and fall of the first patent thicket in American history: the “Sewing Machine War” of the 1850s. The invention of the sewing machine in the antebellum era represents many firsts in the American legal system, including, among others, the first patent thicket, the first “patent troll,” and the first patent pool. Significantly, this case study verifies that patent thickets exist and that they can frustrate commercial development of new products. But it also challenges widely held assumptions in the patent thicket literature. Many scholars believe that this is largely a modern problem arising from a host of allegedly new issues in the patent system, such as incremental high-tech innovation, excessive litigation, and the rise of “patent trolls.” Yet the sewing machine patent thicket exhibited all of these phenomena, revealing that patent thickets have long existed within the historically successful American patent system. The denouement of the sewing machine patent thicket in the Sewing Machine Combination of 1856, the first privately formed patent pool, further challenges the widely held belief that patent thickets are best solved through new statutes, regulations or court decisions that limit property rights in patents. To the contrary, the Sewing Machine Combination was formed against the backdrop of the strong protection of property rights in patents in the antebellum era. Thus, the story of the invention 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.*

### I. 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.<sup>1</sup> The Sewing Machine

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<sup>1</sup> See GRACE ROGERS COOPER, THE SEWING MACHINE: ITS INVENTION AND DEVELOPMENT 38 (2d ed. 1976).

Combination was also the first patent pool in American history,<sup>2</sup> operating successfully from its formation in 1856 until its last patent expired in 1877.<sup>3</sup> Given its far-reaching success as a patent pool and commercial trust, it proved to be a lightning rod for populist-style criticism. An anonymous nineteenth-century “correspondent” to the *Philadelphia Enquirer* 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.<sup>4</sup> Foreshadowing the charges that would soon be leveled at John D. Rockefeller’s even more famous Standard Oil Trust, Horace Greeley’s *New York Daily Tribune* railed against the Sewing Machine Combination as a “most odious monopoly.”<sup>5</sup> 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.”<sup>6</sup>

As an exemplar of the many commercial trusts operating in the nineteenth century, the Sewing Machine Combination is well known today, 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

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<sup>2</sup> 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.”).

<sup>3</sup> *Id.* at 42.

<sup>4</sup> *The Sewing Machine Monopoly*, 36 *SCIENTIFIC AMERICAN* 277 (1877) (quoting from a “correspondent of the *Philadelphia Enquirer*”).

<sup>5</sup> RUTH BRANDON, *A CAPITALIST ROMANCE* 99 (1977) (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].”).

<sup>6</sup> JAMES PARTON, *HISTORY OF THE SEWING MACHINE* 23 (1872). This book was a republication of an article that appeared in the May, 1867 issue of the *Atlantic Monthly*.

War.”<sup>7</sup> 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.<sup>8</sup>

Of course, scholars would now refer to this conflict with less rhetorical flourish, identifying it simply as a patent thicket in sewing machines.<sup>9</sup> A “patent thicket” exists when too many patents covering individual elements of a commercial product are separately owned by different entities.<sup>10</sup> 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.<sup>11</sup> 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.<sup>12</sup> Additionally, a patent thicket can block new research into follow-on inventions,<sup>13</sup> preventing the “progress of the

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<sup>7</sup> 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”).

<sup>8</sup> See, e.g., Joseph Scott Miller, *Standard Setting, Patents, and Access Lock-In: RAND Licensing and the Theory of the Firm*, 40 *IND. L. J.* 351, 386-87 (2007).

<sup>9</sup> 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, *GRIDLOCK ECONOMY* 31 (2008) (“Patent thickets have threatened to strangle emerging industries ranging from sewing machines to computers.”).

<sup>10</sup> 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”).

<sup>11</sup> See Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 *HARV. L. REV.* 621 (1998).

<sup>12</sup> See Shapiro, *supra* note 10, at 119-26.

<sup>13</sup> See, e.g., Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *SCIENCE* 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.”).

Useful Arts.”<sup>14</sup> There is now a debate raging in the literature as to whether patent thickets in fact lead to such problems,<sup>15</sup> but vivid anecdotes abound about obstructed development of new drugs<sup>16</sup> or problems in distributing life-enhancing genetically engineered foods to the developing world.<sup>17</sup>

Given the heightened interest today amongst scholars and lawyers concerning the existence and policy significance of patent thickets, a historical analysis 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 is important. 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.”<sup>18</sup> The sewing machine was the result of numerous incremental and complementary inventive contributions, which lead to a morass of patent infringement litigation given overlapping patent

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<sup>14</sup> See U.S. CONST. art. I, § 8.

<sup>15</sup> Compare, e.g., David E. Adelman & Kathryn L. DeAngelis, *Frontiers of Intellectual Property: Patent Metrics: The Mismeasure of Innovation in the Biotech Patent Debate*, 85 TEX. L. REV. 1677 (2007) (providing empirical study that concludes that there is no patent thicket in biotech) with James Bessen, *Patent Thickets: Strategic Patenting of Complex Technologies* (2003), available at <http://www.researchoninnovation.org/thicket.pdf> (last visited Oct. 22, 2008) (providing empirical study “that patent thickets can reduce R&D incentives even when there are no transaction costs, holdup or vertical monopoly problems”).

<sup>16</sup> See HELLER, *supra* note 9 (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).

<sup>17</sup> See Andrew Pollack, *The Green Revolution Yields to the Bottom Line*, N.Y. TIMES, May 15, 2001, Science Section at 1 (“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, *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.”).

<sup>18</sup> BRANDON, *supra* note 5, at 96 (emphasis added).

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.”<sup>19</sup> 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.<sup>20</sup>

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 having to do with recent changes in technology and law. Professor Heller explicitly makes this point in his recent book, *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.<sup>21</sup>

In fact, Professor Heller’s first foray into patent thicket theory was assessing a potential anticommons in “biomedical research,” which he and his co-author, Professor Rebecca Eisenberg, saw as a logical result of extensive patenting of biotech research tools.<sup>22</sup> Continuing this focus on biotech, *The Gridlock Economy* discusses biotech research and development almost exclusively in its analysis of anticommons theory in patent law.<sup>23</sup> 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,<sup>24</sup> the focus of the

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<sup>19</sup> HELLER, *supra* note 9, at 44.

<sup>20</sup> HELLER, *supra* note 9, at 37.

<sup>21</sup> HELLER, *supra* note 9, at xiv.

<sup>22</sup> See generally Heller & Eisenberg, *supra* note 13.

<sup>23</sup> HELLER, *supra* note 9, at 40-78.

<sup>24</sup> See HELLER, *supra* note 9, at 30-31.

theoretical and empirical studies of patent thickets is on very recent inventions in high-technology and science—computers, telecommunications, and biotech.<sup>25</sup>

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.<sup>26</sup> As Professor Heller euphemistically puts it, “[c]utting-edge technology can be rescued from gridlock by creatively adapting property rights.”<sup>27</sup> More specific proposals have called for limiting conveyance rights in patented drugs,<sup>28</sup> authorizing federal agencies to terminate patent rights to avoid patent thickets,<sup>29</sup> and “excluding patentability of genetic inventions for reasons of morality or public order,”<sup>30</sup> among others. Many scholars concerned about patent thickets hail the U.S. Supreme Court’s recent decision in *eBay v. MercExchange*,<sup>31</sup> because the Court made it more difficult for patentees to become hold-outs through threatening or obtaining injunctions.<sup>32</sup> Although Professor Heller, the Founding

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<sup>25</sup> See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1625-27 (2003); David Evans & Anne Layne-Farrar, *Software Patents and Open Source: The Battle Over Intellectual Property Rights*, 9 VA. J.L. & TECH. 10 (2004); ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS 56-77 (2004); Stephen R. Munzer, *Commons, Anticommons, and Community in Biotechnology Assets*, 10 THEORETICAL INQUIRIES L. 271 (2009); Arti K. Rai, *The Information Revolution Reaches Pharmaceuticals: Balancing Innovation Incentives, Cost, and Access in the Post-Genomics Era*, 2001 ILL. L. REV. 173, 192-94; see also *supra* notes 12-13, 14; *infra* notes 28-29.

<sup>26</sup> See, e.g., Bessen, *supra* note 15, at 1 (“Recent commentators suggest that lower patenting standards encourage patent thickets, creating difficulties for innovators.”); Shapiro, *supra* note 10, at 144 (observing that “increasing 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”).

<sup>27</sup> HELLER, *supra* note 9, at 30.

<sup>28</sup> See Richard A. Epstein & Bruce N. Kuhlik, *Is There a Biomedical Anticommons?*, 27 REGULATION 56-58 (2004) (discussing legislative efforts “to treat the blockade problem” through price controls on pharmaceutical and biotech patents).

<sup>29</sup> See Arti K. Rai & Rebecca S. Eisenberg, *Bayh-DohI Reform and the Progress of Biomedicine*, 66 LAW & CONTEMPORARY PROBS. 289 (2003).

<sup>30</sup> ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, GENETIC INVENTIONS, INTELLECTUAL PROPERTY RIGHTS AND LICENSING PRACTICES, at 75, available at <http://www.oecd.org/dataoecd/42/21/2491084.pdf> (last visited Oct. 26, 2008).

<sup>31</sup> 547 U.S. 388 (2006).

<sup>32</sup> See, e.g., David B. Conrad, *Mining the Patent Thicket: The Supreme Court’s Rejection of the Automatic Injunctin Rule in eBay v. MercExchange*, 26 REV. LITIG. 119 (2007); Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, available at <http://ssrn.com/abstract=1273293> (last visited Oct. 22, 2008);

Father of anticommons theory, acknowledges that “the empirical studies that prove—or disprove—our theory remain inconclusive,”<sup>33</sup> 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 brought to an end, not 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. 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 interference action.

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 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 though pre-existing private-ordering mechanisms, such as contract and corporate law. Heller, to his credit, recognizes that there are

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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 (2007).

<sup>33</sup> HELLER, *supra* note 9, at 77.

“market-driven solutions” to patent thickets,<sup>34</sup> but his writing reveals a deep skepticism about such solutions vis-à-vis his more favorably considered “regulatory solutions.”<sup>35</sup> The Sewing Machine Combination reveals the innovative ways in which patent-owners can rescue themselves from commercial gridlock, and in so doing, unleash an explosion in productivity and innovation in a product that was central to the success of the Industrial Revolution in nineteenth-century America.

## II. THE INCREMENTAL INVENTION OF THE SEWING MACHINE

Today, the sewing machine would hardly be considered a complex invention. In our high-tech world in which pharmaceutical companies now design and construct therapeutic drugs from the protein up,<sup>36</sup> or Apple Computer 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 is downright mundane. This attitude is reinforced by the fact that few young people today have used or even seen a sewing machine, except perhaps in a museum. Yet in the nineteenth century, the sewing machine 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 Howe<sup>37</sup> or Isaac Merritt Singer.<sup>38</sup> Of course, both

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<sup>34</sup> *Id.* at 69-75.

<sup>35</sup> *Id.* at 75-76.

<sup>36</sup> *See infra* note 238.

<sup>37</sup> *See* SCHOOL HOUSE ROCK, MOTHER NECESSITY (1977).

<sup>38</sup> Mahatma Gandhi said the following in 1924 about the invention of the sewing machine: “Today machinery merely helps a few to ride on the back 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.” 6 *A Morning with Gandhiji* (November 13, 1924), 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. In fact, Singer at first demurred to his business associates’ request to tinker with the

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, such as Charles Goodyear's invention of vulcanized rubber in 1839<sup>39</sup> or Samuel Morse's self-described "flash of genius" in conceiving of the telegraph machine in 1832.<sup>40</sup>

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.<sup>41</sup> 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."<sup>42</sup> In antebellum America, Thomas Hood's *Song of the Shirt* was popular because it lamented the well-known working conditions of seamstresses.<sup>43</sup> The hand-sewing trade and its

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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 5, at 88.

<sup>39</sup> See CHARLES SLACK, NOBLE OBSESSION 83-90 (2002).

<sup>40</sup> EVANS, *supra* note 5, at 71.

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

<sup>42</sup> BRANDON, *supra* note 5, at 67.

<sup>43</sup> 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,

workers would benefit tremendously from mechanization. As one historian remarked, “[l]ooked at in the abstract, in terms purely of ideas and markets, the sewing machine could not fail.”<sup>44</sup>

Yet efforts to create a sewing machine for almost a century did repeatedly fail. 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. 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 1958 article: (1) the sewing of a lockstitch,<sup>45</sup> (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 clothe (synchronized with the needle motion), (8) tension controls for the thread that give slack as needed, (9) a device to hold the clothe in place with each stitch (called a “presser foot”), and (10) the ability to sew in either straight or curved lines.<sup>46</sup> 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.<sup>47</sup> But Singer was neither the first person to invent all ten elements nor was he the first to patent them.

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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!”

BRANDON, *supra* note 5, at 68.

<sup>44</sup> BRANDON, *supra* note 5, at 67.

<sup>45</sup> 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 5, at 58.

<sup>46</sup> See Andrew B. Jack, *The Channels of Distribution for an Innovation: The Sewing-Machine Industry in America, 1860-1865*, 9 EXPLORATIONS IN ENTREPRENEURIAL HISTORY 113 (1956).

<sup>47</sup> See *infra* notes 98-107, 122 and accompanying text.

Many 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.<sup>48</sup> Weisenthal, however, did not commercially 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.<sup>49</sup> 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 machine that produced a chainstitch. Unfortunately, he did not patent or commercialize his invention, and, according to one historian, the invention "died with the inventor in 1813."<sup>50</sup> A year after Krems died, Josef Madersperger, a tailor in Vienna, Austria, invented a sewing machine for the purpose of producing embroidery, and in 1839, he invented a sewing machine that used an eye-pointed needle and which used a second thread to create a lockstitch (Bradshaw's first element).<sup>51</sup> Madersperger received Austrian patents for both inventions, but his machines were defective and 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 stitching ornamental

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<sup>48</sup> See COOPER, *supra* note 1, at 4.

<sup>49</sup> See COOPER, *supra* note 1, at 7.

<sup>50</sup> COOPER, *supra* note 1, at 8.

<sup>51</sup> COOPER, *supra* note 1, at 8-9.

designs on gloves, but they neither intended nor used their machine and its eye-pointed needle for the general purpose of sewing.<sup>52</sup>

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.”<sup>53</sup> 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.<sup>54</sup>

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.<sup>55</sup> 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.”<sup>56</sup> Unable to overcome the vociferous political and economic opposition to his invention, Thimonnier died poor without realizing any financial

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<sup>52</sup> COOPER, *supra* note 1, at 13 (noting that they “never contemplated [their invention] as a sewing machine”).

<sup>53</sup> COOPER, *supra* note 1, at 6.

<sup>54</sup> Similarly, an American inventor, John J. Greenbough, 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. COOPER, *supra* note 1, at 13.

<sup>55</sup> COOPER, *supra* note 1, at 11.

<sup>56</sup> BRANDON, *supra* note 5, at 57.

gain from his invention. 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.<sup>57</sup> 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.”<sup>58</sup>

Despite these Old World efforts at inventing a sewing machine, it was a series of American inventors, working in the 1840s and 1850s, who succeed in threading the needle in creating the first practical sewing machine.<sup>59</sup> Confirming Alex de Tocqueville’s observation that “the Americans always display a clear, free, original, and inventive power of mind,”<sup>60</sup> it was American tradesmen and machinists who recognized that a practical and successful sewing machine could not simply replicate the motion of human hands. With this pragmatic approach to innovation,<sup>61</sup> antebellum Americans easily made the conceptual leap from hand-motion to machine-motion, and thus proceeded to invent (and re-invent) 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 invention of the Corliss steam engine), but these turned out to be of little significance.<sup>62</sup> It was not until 1843 that Elias Howe, Jr. invented his version of the sewing machine, which was

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<sup>57</sup> COOPER, *supra* note 1, at 15 n.31 (“This is the earliest known patent using the combination of an eye-pointed need and a shuttle to form a stitch.”).

<sup>58</sup> *Id.* at 16.

<sup>59</sup> COOPER, *supra* note 1, at 19.

<sup>60</sup> ALEX DE TOCQUEVILLE, *DEMOCRACY IN AMERICA* 460 (J.P. Mayer ed., George Lawrence trans., 1969) (1840).

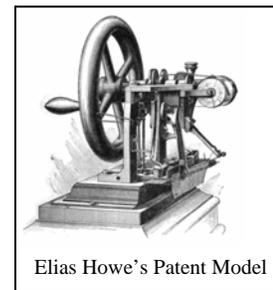
<sup>61</sup> *Id.* (noting how “the purely practical side of science is cultivated admirably” in America).

<sup>62</sup> 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. 2,466, issued Feb. 21, 1842), Benjamin W. Bean (patent no. 2,982, issued Mar. 4, 1843), and James Rodgers (patent no. 3,672, issued July 22, 1844). See COOPER, *supra* note 1, at 13-15.

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.’”<sup>63</sup> The “capitalist” then told the inventor that, if he could invent a sewing machine, “I’ll insure you an independent fortune.”<sup>64</sup> Although having received no formal schooling in natural philosophy or mechanics (a common trait of most American inventors of the day), Howe was impressed by 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



Elias Howe's Patent Model

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 shuttle to create a lockstitch.<sup>65</sup> The *Scientific American* promptly published the patent claims on

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<sup>63</sup> BRANDON, *supra* note 5, at 60.

<sup>64</sup> *Id.*

<sup>65</sup> U.S. Patent No. 4,750. The drawing of the patent model is from Wikimedia Commons, available at [http://en.wikipedia.org/wiki/File:Elias\\_Howe\\_sewing\\_machine.png](http://en.wikipedia.org/wiki/File:Elias_Howe_sewing_machine.png) (last visited March 4, 2009).

September 26, 1846, under the heading “New Inventions.”<sup>66</sup> Howe’s three elements formed the core of the Singer Sewing Machine that would eventually sweep the United States in the 1850s.

Howe’s sewing machine, of which the patent model “is acknowledged to be one of the most beautiful ever presented to the Patent Office,”<sup>67</sup> was a feat of engineering. It sewed 250 stitches per minute—seven times faster than sewing by hand.<sup>68</sup> 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.<sup>69</sup>

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.<sup>70</sup> For instance, Howe’s sewing machine used a vertical surface, which did not permit easy passage of the clothe past the curved eye-pointed needle. Also, the curved eye-pointed needle, which moved horizontally against the vertical surface, was brittle and often broke.<sup>71</sup> Lastly, the mechanism for feeding the clothe through the vertical sewing machine, called a “baster plate,”

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<sup>66</sup> See SCIENTIFIC AMERICAN 4 (1846).

<sup>67</sup> BRANDON, *supra* note 5, at 64.

<sup>68</sup> PARTON, *supra* note 6, at 8.

<sup>69</sup> See *The Story of the Sewing Machine*, 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 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 39, 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 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. 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* 73-78 (2001).

<sup>70</sup> See U.S. Patent No. 5,942 (issued Nov. 28, 1848). Bradshaw failed to improve on the defects in Howe’s invention. COOPER, *supra* note 1, at 22.

<sup>71</sup> See BRANDON, *supra* note 5, at 45 (quoting Singer’s description of this problem with Howe’s sewing machine).

made it impossible to either sew in a single continuous motion or to sew curved seams.<sup>72</sup> 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.<sup>73</sup>

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.<sup>74</sup> Bachelder obtained an improvement patent on Morey and Johnson's invention,<sup>75</sup> which claimed several additional elements of the successful sewing machine, including a horizontal table for holding the clothe, a vertical, reciprocating eye-pointed needle, and a more functional feeding mechanism for moving the clothe through the sewing machine.<sup>76</sup> Bachelder did not manufacture his sewing machine; rather, he later sold his patent to Singer, who brought it into the Sewing Machine Combination in 1856. This patent “eventually became one of the most important patents to be contributed to the Sewing Machine Combination.”<sup>77</sup>

Later in 1849, another inventor, Sherburne C. Blodgett, received a patent on a “rotary sewing machine,” which used a revolving shuttle in making the lockstitch. Unlike Howe and Bachelder, however, Blodgett joined forces with J.H. Lerow and began manufacturing the

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<sup>72</sup> *Id.* at 72 (“Singer had overcome the main defect of Howe’s machine, which was that the cloth was fed through a means of a ‘baster plate’ of limited size to which it was attached . . . so it was impossible to sew a long continuous seam, to sew curved seams or turn corners.”).

<sup>73</sup> See PARTON, *supra* note 6, at 12-14.

<sup>74</sup> See U.S. Patent No. 6,099 (issued Feb. 6, 1849).

<sup>75</sup> See U.S. Patent No. 6,439 (issued May 8, 1849).

<sup>76</sup> See Bourne, *supra* note 81, at 531.

<sup>77</sup> COOPER, *supra* note 1, at 23.

device, which soon came to be known as the “Lerow and Blodgett machine.”<sup>78</sup> This sewing machine was ungainly, and, even worse, prone to failure.<sup>79</sup> It was a Lerow & Blodgett sewing machine on which Singer would experiment in making his own inventive contributions several years later, and one of Singer’s business partners, George Zeiber, complained about the quality of the Lerow & Blodgett machine: “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.”<sup>80</sup>

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.”<sup>81</sup> Wilson received a total of four patents on sewing machines, which issued between 1850 and 1854.<sup>82</sup> 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.<sup>83</sup>

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

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<sup>78</sup> BRANDON, *supra* note 5, at 43.

<sup>79</sup> BRANDON, *supra* note 5, at 43.

<sup>80</sup> BRANDON, *supra* note 5, at 43.

<sup>81</sup> Frederick G. Bourne, *American Sewing Machines*, in 2 ONE HUNDRED YEARS OF AMERICAN COMMERCE 527 (Chauncey M. Depew ed., 1968). Such sentiments have been seconded by others. *See* COOPER, *supra* note 1, 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”).

<sup>82</sup> *See* U.S. Patent No. 7,776 (issued Nov. 12, 1850); U.S. Patent No. 8,296 (issued Aug. 12, 1851); U.S. Patent No. 9,041 (issued June 15, 1852); U.S. Patent No. 12,116 (issued Dec. 19, 1854).

<sup>83</sup> *See* COOPER, *supra* note 1, 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.”).

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,<sup>84</sup> 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 machines on the basis of Wilson's three subsequent patents.<sup>85</sup> 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 polygamist who married at least five women over his lifetime, lived at times under false names, fathered at least eighteen children out of wedlock, and whose violent temper often terrorized his family members, business partners and professional associates.<sup>86</sup> 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.”<sup>87</sup>

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. 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

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<sup>84</sup> See *supra* note 70 and accompanying text.

<sup>85</sup> Wilson seemed to have learned his lesson from his unfortunate experience with Kline & Lee, as his third patent, which 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 may have caused.” COOPER, *supra* note 1, at 28. The stationary bobbin was tremendously successful. *Id.*

<sup>86</sup> See EVANS, *supra* note 5, at 84-86.

<sup>87</sup> BRANDON, *supra* note 5, at 93.

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.”<sup>88</sup> 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 patent infringement lawsuits about his act of invention, which he claimed 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 forty dollars, or not get it at all.”<sup>89</sup> 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 also caused the thread to unravel, making the thread more prone to break as well.<sup>90</sup> Singer corrected these problems by replacing the curved needle with a straight needle that was positioned vertically rather than horizontally.<sup>91</sup> Moreover, he replaced the rotating shuttle with a reciprocating shuttle.<sup>92</sup> Unfortunately, at that point, the sewing machine would still not sew what Singer referred to as “tight stitches.”<sup>93</sup> 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.<sup>94</sup> (This is surprisingly similar rhetoric to that used by Morse in describing his own “flash of genius” in conceiving of the telegraph.)<sup>95</sup> 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

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<sup>88</sup> BRANDON, *supra* note 5, at 46-47 (quoting the contract in its entirety).

<sup>89</sup> COOPER, *supra* note 1, at 30 (quoting Singer’s trial testimony reproduced in Chester McNeil, *A History of the Sewing Machine*, 3 UNION SALES BULLETIN 83-85 (1903))

<sup>90</sup> BRANDON, *supra* note 5, at 45.

<sup>91</sup> COOPER, *supra* note 1, at 30.

<sup>92</sup> BRANDON, *supra* note 5, at 45.

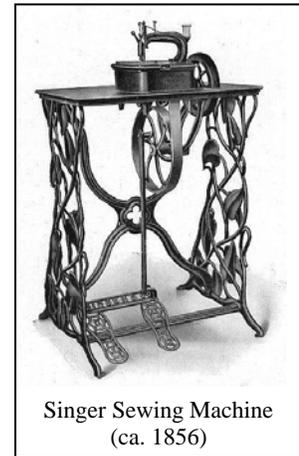
<sup>93</sup> COOPER, *supra* note 1, at 30.

<sup>94</sup> COOPER, *supra* note 1, at 30.

<sup>95</sup> See *supra* note 40 and accompanying text.

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.”<sup>96</sup>

Singer’s sewing machine was invented in September 1850, and his patent ultimately issued on August 12, 1851.<sup>97</sup> Singer never pretended that he invented the sewing machine *ex nihilo*,<sup>98</sup> and his patent confirms this. His invention was an improvement on pre-existing sewing machines, such as the Lerow & Blodgett machine on which he worked at Phelps’s workshop. Specifically, he claimed and described a sewing machine in which the clothe 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 clothe,<sup>99</sup> which was held in place by a presser foot as it was stitched.<sup>100</sup> A foot pedal provided continuous motion to the sewing machine through a series of drive belts, which now made it possible for a sewing machine operator to exert seamless control over the continuous movement of the clothe,<sup>101</sup> although Singer was unable to claim this

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<sup>96</sup> COOPER, *supra* note 1, at 30.

<sup>97</sup> See U.S. Patent No. 8,294. The picture is of a later model produced by Singer in 1856, available at <http://www.ismacs.net/singer/turtle.html> (last visited March 4, 2009), but it clearly shows some of the innovative elements of the sewing machine invented by Singer in 1850, such as the overhanging arm and the treadle.

<sup>98</sup> BRANDON, *supra* note 5, at 53.

<sup>99</sup> COOPER, *supra* note 1, at 31-32. See *supra* note 45 (describing how a lockstitch is made using two threads, an eye-pointed needle, and a shuttle).

<sup>100</sup> 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 81, at 527 (“The yielding presser-foot was claimed by Singer in his original application for a patent on a sewing-machine; but this claim was disallowed because there was a question as to who was the first to invent this important feature, although the idea was undoubtedly original with Singer.”).

<sup>101</sup> 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 mechanical foot power. Singer, however, forgot to patent the treadle. See COOPER, *supra* note 1, 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, § 7, 5 Stat. 354 (1839). He may have had some difficulty in patenting it anyway, as the treadle itself had been invented before Singer applied it to the sewing machine. Leonardo Da Vinci, for instance, conceived of a treadle to power a lathe. [get citation] Da Vinci’s discovery,

innovative feature in his patent. Moreover, with the synchronization of the shuttle and needle, which produced the necessary tension in the thread for continuous sewing in straight and curved lines, the invention now contained all ten elements necessary for a practical and commercially successful sewing machine.<sup>102</sup> The ultimate utility of Singer’s final improvements was irrefutable: A trained seamstress could sew by hand 40 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.<sup>103</sup>

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,”<sup>104</sup> 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.”<sup>105</sup> They published their first newspaper advertisement on November 7, 1850, with a large headline in bold, capital letters, “SEWING BY MACHINERY.”<sup>106</sup> 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

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however, may have been what patent lawyers call a “lost art.” See *Gayler v. Wilder*, 51 U.S. 477, 497 (1850). Moreover, Singer still could claim the honor in inventing the use of a treadle to power a sewing machine, innovating the *combination* of the treadle and the sewing machine. 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. See BRANDON, *supra* note 5, at 73.

<sup>102</sup> See *supra* note 46 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 81, at 527.

<sup>103</sup> See EVANS, *supra* note 5, at 88.

<sup>104</sup> BRANDON, *supra* note 5, at 46.

<sup>105</sup> COOPER, *supra* note 1, 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 frivolities, but in the end the play on words appeal to him, and he agreed.” BRANDON, *supra* note 5, at 51.

<sup>106</sup> BRANDON, *supra* note 5, at 50. All quotes taken from this ad are from this monograph.

“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 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.”<sup>107</sup>

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,<sup>108</sup> 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 his [Howe’s] device or seen it demonstrated, and had turned their hand to producing something similar. The Lerow and Blodgett machine which had been the basis for Singer’s improvements was one such piece of work.”<sup>109</sup> 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.

### III. 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 it was said in 1867 that “the secret of

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<sup>107</sup> BRANDON, *supra* note 5, at 51.

<sup>108</sup> BRANDON, *supra* note 5, at 66.

<sup>109</sup> BRANDON, *supra* note 5, at 71.

Mr. Howe's success" was that "he litigated himself into fortune and fame."<sup>110</sup> 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 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.<sup>111</sup>

What is perhaps more surprising is the degree to which the Sewing Machine War exhibited many features of a patent thicket and ancillary policy concerns, such as "patent trolls"<sup>112</sup> and the proliferation of satellite litigation.<sup>113</sup> For instance, Howe was a non-practicing entity, i.e., a patent-owner who is not actively commercializing his own intellectual property. In modern parlance, Howe was a "patent troll." Although this epithet has proven exceedingly difficult to define with precision,<sup>114</sup> an oft-cited feature is that the patent-owner makes money solely through royalties obtained through infringement litigation (or threats of litigation).<sup>115</sup> Moreover, in exacting licenses from sewing machine manufacturers in the face of infringement

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<sup>110</sup> *Who Invented Sewing-Machines?*, THE GALAXY, Aug. 1867, at 479.

<sup>111</sup> See COOPER, *supra* note 1, 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").

<sup>112</sup> See F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L. J. 327, 396 (2007) ("Another version of the anticommons problem for IP appears to be what some call the problem of 'patent trolls.'").

<sup>113</sup> See *infra* notes 137-139 and accompanying text (discussing Howe's libel suit against the *New York Daily Tribune* following its publication of Singer's advertisements).

<sup>114</sup> See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEXAS L. REV. 1991, 2009 (2007) ("Defining a patent troll has proven a tricky business, but that does not mean the problem does not exist."); Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry*, 83 TEXAS 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.").

<sup>115</sup> See *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 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"); John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEXAS L. REV. 2111 (2007); 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."); Steve Seidenberg, *Troll Control: The Supreme Court's eBay Decision Sets Back Pesky 'Patent Trolls' or American Innovation, Depending upon Which Side You're On*, A.B.A. J., Sept. 2006, at 51.

lawsuits, Howe exploited what some scholars call “royalty stacking,” i.e., obtaining royalty fees that exceed the value of an incremental inventive contribution to a final commercial product.<sup>116</sup> If these are the characteristics that define “patent troll” activity, then Howe was a “patent troll”—pioneering these tactics well over one hundred years before this term was even coined.<sup>117</sup>

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.<sup>118</sup> 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 claimed in Howe’s patent.<sup>119</sup> Since he was destitute, he 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).<sup>120</sup> 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.”<sup>121</sup>

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.<sup>122</sup> Howe quickly contacted Singer, asserting that the Singer Sewing Machine infringed Howe’s 1846 patent. In the ensuing negotiations, Howe demanded a \$2,000 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

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<sup>116</sup> Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEXAS L. REV. 2163 (2007).

<sup>117</sup> See *infra* notes 240-241 and accompany text (discussing use of this term in modern patent litigation).

<sup>118</sup> BRANDON, *supra* note 5, at 71.

<sup>119</sup> See *supra* note 65 and accompanying text.

<sup>120</sup> BRANDON, *supra* note 5, at 72.

<sup>121</sup> BRANDON, *supra* note 5, at 71-72.

<sup>122</sup> BRANDON, *supra* note 5, at 74-76.

monies to pay Howe.<sup>123</sup> 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."<sup>124</sup> 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."<sup>125</sup>

Howe returned again in 1851 and 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.<sup>126</sup> (This amounts to approximately \$645,500 today.)<sup>127</sup> Singer again demurred. Singer's attorney, and new business partner, Edward Clark,<sup>128</sup> 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 to use of the combination of needle and shuttle . . ."<sup>129</sup> 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, in which it was reported at the time that the "case was very closely contested," Judge Sprague ruled in

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<sup>123</sup> BRANDON, *supra* note 5, at 76.

<sup>124</sup> BRANDON, *supra* note 5, at 76.

<sup>125</sup> BRANDON, *supra* note 5, at 76.

<sup>126</sup> See COOPER, *supra* note 1, at 33.

<sup>127</sup> See Consumer Price Index (Estimate), Federal Reserve Bank of Minneapolis, [http://www.minneapolisfed.org/community\\_education/teacher/calc/hist1800.cfm](http://www.minneapolisfed.org/community_education/teacher/calc/hist1800.cfm) (last visited Oct. 10, 2008) (noting that \$1 in 1850 is worth \$25.82 in 2008).

<sup>128</sup> Given his fractious nature, Singer's dealings with his business partners reads 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. Singer then formed a formal business partnership with Edward Clark in 1851, who was his attorney representing him in his legal contest with Howe. See EVANS, *supra* note 5, at 90.

<sup>129</sup> See BRANDON, *supra* note 5, at 89 (quoting Clark without citation). There is no extant record of a lawsuit filed by Singer's company against Howe in 1853.

Howe's favor on July 12, 1852.<sup>130</sup> Howe quickly obtained preliminary injunctions against Singer and the remaining defendants.<sup>131</sup> 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.<sup>132</sup> 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 the American Magnetic Sewing Machine Co., Bartholf, Nichols & Bliss, and Woolridge, Keene & Moore.<sup>133</sup> These sewing machine manufacturers were now paying Howe \$25 for each sewing machine they produced.<sup>134</sup>

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 practicality. 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.<sup>135</sup>

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:

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<sup>130</sup> See *Interesting Patent Case*, SCIENTIFIC AMERICAN 356 (1852).

<sup>131</sup> See COOPER, *supra* note 1, at 33, 41.

<sup>132</sup> See COOPER, *supra* note 1, at 24.

<sup>133</sup> See COOPER, *supra* note 1, at 41 n.64. Aside from his licenses achieved through litigation, threatened and actual, Howe also licensed his brother, Amasa B. Howe, to manufacture sewing machines. *Id.*

<sup>134</sup> See BISSELL, *supra* note 7, 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.

<sup>135</sup> See BRANDON, *supra* note 5, at 90.

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 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 MACHINES . . . .<sup>136</sup>

Howe responded to such advertisements by charging I.M. Singer & Co. with libel,<sup>137</sup> and he promptly filed suit against the *New York Daily Tribune* for publishing Singer’s libel. 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 sewing machine that produced a lockstitch.<sup>138</sup> On August 20, 1853, the magazine opined: “We do not think that Mr. Howe is justified in suing the ‘Tribune’ for libel, but neither was it right for that paper to permit the advertisement of Singer, containing, as it did, such pointed and offensive language.”<sup>139</sup>

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:

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<sup>136</sup> See BRANDON, *supra* note 5, at 90.

<sup>137</sup> See BRANDON, *supra* note 5, at 90-91 (“CAUTION. ALL PERSONS ARE CAUTIONED against publishing the libelous advertisements of I.M. I.M. Singer & Co. against me as they will be prosecuted to the fullest extent of the law for such publications.”).

<sup>138</sup> See, e.g., *The Fair of the American Institute*, SCIENTIFIC AMERICAN 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”).

<sup>139</sup> *Patent Law Suits—Sewing Machines*, SCIENTIFIC AMERICAN 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. . . . Among the many new inventions were 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.*

All the other manufacturers had yielded to Howe . . . . They viewed the contest between Howe and I.M. 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.'<sup>140</sup>

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."<sup>141</sup> 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.<sup>142</sup>

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 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,<sup>143</sup> because Howe claimed as his invention the novel and useful *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.

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<sup>140</sup> See BRANDON, *supra* note 5, at 91.

<sup>141</sup> BRANDON, *supra* note 5, at 91. Zieber also noted that Singer also raged against Howe's new licensees, such as "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 Willcox and Gibbs caused him to pass many unhappy hours." *Id.*

<sup>142</sup> See BRANDON, *supra* note 5, at 89.

<sup>143</sup> See *supra* notes 48-52 and accompanying text.

Singer first attempted to uncover prior art in the patent offices in England, France, and, of course, the United States, and 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.<sup>144</sup> Singer's efforts proved fruitless until he discovered Walter Hunt, a prolific American antebellum inventor.<sup>145</sup> 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 for his discovery.

In 1853, 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.<sup>146</sup> In 1853, Hunt had difficulty in recreating a working sewing machine from these nineteen-year-old remnants, but 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.”<sup>147</sup> With Hunt's rebuilt sewing machine as evidence corroborating his act 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

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<sup>144</sup> See PARTON, *supra* note 6, at 19.

<sup>145</sup> See *Who Invented Sewing-Machines?*, *supra* note 110, at 475 (“Up to 1853, [Walter Hunt] had himself obtained patents for more than twenty of his own inventions.”).

<sup>146</sup> See BRANDON, *supra* note 5, at 92.

<sup>147</sup> See BRANDON, *supra* note 5, at 93.

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.”<sup>148</sup> The magazine then republished Hunt’s lengthy advertisement in the *New York 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 need with the eye near the point. He was not the original inventor of the combination of the eye-pointed need 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 . . . .<sup>149</sup>

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.”<sup>150</sup> 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.”<sup>151</sup>

Following the extensive interference action at the Patent Office, which involved “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 and shuttle,<sup>152</sup> Patent Commissioner Charles Mason ruled on May 24, 1854 that Howe was entitled to his patent. Mason acknowledged that Hunt invented the elements of the sewing machine that

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<sup>148</sup> *Sewing Machine Controversy*, SCIENTIFIC AMERICAN 21 (1853). On a similar note, when *Scientific American* sensed the imminent explosion of the Sewing Machine War a few years, 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*, SCIENTIFIC AMERICAN 245 (1854)

<sup>149</sup> *Id.*

<sup>150</sup> *Id.*

<sup>151</sup> *Id.*

<sup>152</sup> See *Who Invented Sewing-Machines?*, *supra* note 110, at 474.

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.<sup>153</sup> Hunt appealed Mason's decision to the Circuit Court of the District of Columbia, asserting a whole slew of legal issues, including even that Mason lacked statutory authority to decide an interference action 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.<sup>154</sup>

Despite Hunt's final loss in the Circuit Court in 1855, 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.<sup>155</sup> 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 interference action 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 his decision on Howe's request for a preliminary injunction, Judge Sprague acknowledged the "earnestness and zeal with

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<sup>153</sup> See BRANDON, *supra* note 5, at 95. 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.*

<sup>154</sup> See *Hunt v. Howe*, 12 F. Cas. 918 (C.C.D.C. 1855) (No. 6,891).

<sup>155</sup> See, e.g., *Howe v. Williams*, 12 F. Cas. 689, 695 (C.C. Mass. 1863) (No. 6,778).

which the contestation has been carried on”<sup>156</sup> both in this case and in the many other legal actions. 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.”<sup>157</sup> The defendants also argued again that Hunt had anticipated Howe’s invention, despite the earlier defeat of Walter Hunt in the interference action before Commissioner Mason. After carefully analyzing the evidence of the reconstruction of Hunt’s invention in 1853, Judge Sprague coolly remarked that “[p]rophecy after the event is easy prophecy.”<sup>158</sup> Judge Sprague thus ruled Howe’s patent valid and infringed, and issued a preliminary injunction.<sup>159</sup> The firms settled with Howe, who then promptly filed lawsuits directly against Singer in federal courts in New Jersey and New York, requesting injunctions.<sup>160</sup>

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,<sup>161</sup> but there is no extant court decision confirming this report and it is likely incorrect. Others have written instead that I.M. Singer & Co. settled with Howe on July 1, 1854, agreeing to pay Howe \$15,000 to settle their dispute.<sup>162</sup> In addition to the \$15,000 settlement, Singer further agreed to

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<sup>156</sup> *Howe v. Underwood*, 12 F. Cas. 678, 680 (C.C. Mass. 1854) (No. 6,775)

<sup>157</sup> *Underwood*, 12 F. Cas. at 680.

<sup>158</sup> *Underwood*, 12 F. Cas. at 685.

<sup>159</sup> *Underwood*, 12 F. Cas. at 687.

<sup>160</sup> *Who Invented Sewing-Machines?*, THE GALAXY, Aug. 1867, at 480.

<sup>161</sup> See BRANDON, *supra* note 5, at 95.

<sup>162</sup> See BISSELL, *supra* note 7, 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 81, 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.”).

pay Howe a \$25 royalty, consistent with Howe's other license agreements,<sup>163</sup> for each Singer Sewing Machine produced thereafter.<sup>164</sup>

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 their public announcement of the settlement of their "long and protracted legal controversy."<sup>165</sup> 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 infringer 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."<sup>166</sup> It perhaps should be unsurprising that, after Howe and Singer concluded their dispute, "all the sewing machine manufacturers got busily down to the job of suing each other out of existence."<sup>167</sup>

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.<sup>168</sup> 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.,

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<sup>163</sup> See *supra* note 134 and accompanying text.

<sup>164</sup> See BRANDON, *supra* note 5, at 95.

<sup>165</sup> *Sewing Machines—Card to the Public*, SCIENTIFIC AMERICAN 383 (1862).

<sup>166</sup> *Id.*

<sup>167</sup> BRANDON, *supra* note 5, at 95.

<sup>168</sup> BRANDON, *supra* note 5, at 96-97.

two of its main competitors in the sewing machine market.<sup>169</sup> 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.<sup>170</sup>

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.”<sup>171</sup> In an age before computers, word processors or typewriters, producing more than 3,500 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.”<sup>172</sup> An author of a nineteenth-century 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.”<sup>173</sup> One historian observes that “the continuing court litigation over rival patent rights seemed destined to ruin the economics of the new industry.”<sup>174</sup>

Although these details of the Sewing Machine War are well known, at least to some historians, no one has yet explained why this patent thick arose beyond identifying the fact that there were overlapping patent claims. But this does not by itself create a patent thicket, as there

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<sup>169</sup> BRANDON, *supra* note 5, at 97.

<sup>170</sup> See COOPER, *supra* note 1, 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”).

<sup>171</sup> BRANDON, *supra* note 5, at 96.

<sup>172</sup> 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 5, at 96.

<sup>173</sup> PARTON, *supra* note 6, at 11-12 (emphasis added).

<sup>174</sup> COOPER, *supra* note 1, at 35.

have to be reasons why patent-owners assert these property claims against each other to the point of creating a litigation free-for-all, replicating the conditions of Thomas Hobbes's state of nature.<sup>175</sup> 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 there had in fact 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.<sup>176</sup> 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.<sup>177</sup> 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.<sup>178</sup> 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."<sup>179</sup>

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<sup>175</sup> See THOMAS HOBBS, *LEVIATHAN* 107 (1958) (1660) (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").

<sup>176</sup> See *supra* notes 69-73 and accompanying text.

<sup>177</sup> See *supra* note 80 and accompanying text.

<sup>178</sup> BRANDON, *supra* note 5, at 51-52.

<sup>179</sup> BRANDON, *supra* note 5, at 70.

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,<sup>180</sup> 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.<sup>181</sup> Moreover, 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!"<sup>182</sup> Although Singer eventually acted against his chauvinism, he was not alone in thinking such things, and the luddites who were agitating the sewing unions used these widespread prejudices to reinforce their arguments. An 1858 address to the Shirt Sewers' and Seamstresses' Union 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."<sup>183</sup> In sum, in the early 1850s, the financial success of the sewing machine was still an abstraction, but the prior failures, the skeptical public, and existing cultural prejudices were a concrete reality.

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<sup>180</sup> See, e.g., *The Sewing Machine—Its Origin and Suggestions for Improvement*, SCIENTIFIC AMERICAN 246 (1869). See notes 55-58 and accompanying text (describing Thimonnier's work and tragic downfall).

<sup>181</sup> See BRANDON, *supra* note 5, at 69. ("As late as 1858, the spirit of the Luddites and of the enraged tailors who destroyed poor Thimonnier's machines still held sway in the Shirt Sewers' and Seamstresses' Union."); PARTON, *supra* note 6, 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").

<sup>182</sup> EVANS, *supra* note 5, at 88.

<sup>183</sup> BRANDON, *supra* note 5, at 70.

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 such 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 for the past six years to remedy the inventor's extreme poverty, was now producing an income of "a few hundred dollars a year."<sup>184</sup> 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).<sup>185</sup> 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.<sup>186</sup> Such extensive licensing profits led one anonymous writer in 1867 to complain that Howe had "been overpaid for his inventive labors,"<sup>187</sup> or, as some patent scholars would say today, Howe exploited "royalty stacking" to obtain license fees exceeding his incremental contribution.<sup>188</sup> By the early 1860s, 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 that had been issued on sewing machines by that time.<sup>189</sup>

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

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<sup>184</sup> PARTON, *supra* note 6, at 21.

<sup>185</sup> *To the Editor of the New-York Times, 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 5, at 99.

<sup>186</sup> PARTON, *supra* note 6, at 21.

<sup>187</sup> *Who Invented Sewing-Machines?*, *supra* note 110, at 471.

<sup>188</sup> *See supra* note 116 and accompanying text.

<sup>189</sup> *See The Sewing Machine Business as it is Compared with What it was Ten Years Ago*, 7 SCIENTIFIC AMERICAN 105 (1862) ("Since the first sewing machine was illustrated in our columns up to the first July of 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 81, at 533 (reporting that there were 70 total patents on sewing machines by 1855 and 843 patents on sewing machines by 1867).

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,<sup>190</sup> 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."<sup>191</sup> The result was a flurry of lawsuits as these myriad patent-owners, such as I.M. Singer & Co., Lerow & Blodgett, Wilson, Wheeler & Co., and others, attempted to claim their rightful slice of the royalty pie. In so doing, they created the first American patent thicket.

#### IV. 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 I.M. Singer

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<sup>190</sup> See *supra* notes 69-73 and accompanying text (discussing Howe's failed attempts at commercializing his patent).

<sup>191</sup> HENRY HOWE, ADVENTURES AND ACHIEVEMENTS OF AMERICANS 159 (1861).

& Co., Wheeler, Wilson & Co., Grover & Baker, and Howe combine their patents.<sup>192</sup> 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 this “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.<sup>193</sup> Howe, however, initially opposed it, and, given the fundamental status of his 1846 patent in the sewing machine industry, the patent pool could not work without Howe’s participation.<sup>194</sup> 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 infringement lawsuits 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.<sup>195</sup> Most important, Howe wrung a third concession from the other three firms that the Sewing Machine Combination would have no less than 24 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.

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<sup>192</sup> See BISSELL, *supra* note 7, at 85-86.

<sup>193</sup> See BISSELL, *supra* note 7, at 85-86; BRANDON, *supra* note 5, at 98; COOPER, *supra* note 1, at 41.

<sup>194</sup> See *id.*

<sup>195</sup> COOPER, *supra* note 1, at 41.

The Sewing Machine Combination<sup>196</sup> 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.<sup>197</sup> 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.<sup>198</sup> In 1860, the Combination reduced this fee from \$15 to \$7, and Howe's royalty was reduced to \$1 for all sewing machines.<sup>199</sup>

Yet the Combination was more than just a patent pool, it was also a trust.<sup>200</sup> 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.<sup>201</sup> Unfortunately, the Combination's records were lost in a fire,<sup>202</sup> but a few remnants remain, which show that member and non-member firms received licenses for producing hundreds of thousands of sewing machines.<sup>203</sup> As the head of the Combination, Potter also became a lead plaintiff in many of the future infringement lawsuits concerning the

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<sup>196</sup> It was also referred to as the "Albany Agreement of 24 October 1856." BISSELL, *supra* note 7, at 87.

<sup>197</sup> 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 1, at 41-42.

<sup>198</sup> COOPER, *supra* note 1, at 42.

<sup>199</sup> See COOPER, *supra* note 1, at 42.

<sup>200</sup> See *Potter v. Wilson*, 19 F. Cas. 1193, 1196 (C.C.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").

<sup>201</sup> See COOPER, *supra* note 1, at 42.

<sup>202</sup> See Bourne, *supra* note 81, at 530.

<sup>203</sup> See COOPER, *supra* note 1, at 40.

Combination's patents.<sup>204</sup> 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.<sup>205</sup>

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.<sup>206</sup> As Circuit 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."<sup>207</sup> Despite this continuing litigiousness, the principal sewing machine patents were now under one commercial umbrella,

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<sup>204</sup> See *Potter v. Braunsdorf*, 19 F. Cas. 1132 (C.C.N.Y. 1869) (No. 11,321); *Potter v. Empire Sewing Machine Co.*, 19 F. Cas. 1147 (C.C.N.Y. 1868) (No. 11,326); *Potter v. Mack*, 19 F. Cas. 1166 (C.C. Ohio 1868) (No. 11,331); *Potter v. Schenck*, 19 F. Cas. 1182 (C.C. Ill. 1866) (No. 11,337); *Potter v. Whitney*, 19 F. Cas. 1191 (C.C. Mass. 1866) (No. 11,341); *Potter v. Muller*, 19 F. Cas. 1168 (C.C. Ohio 1865) (No. 11,333); *Potter v. Muller*, 19 F. Cas. 1170 (C.C. Ohio 1864) (No. 11,334); *Potter v. Dixon*, 19 F. Cas. 1145 (C.C.N.Y. 1863) (No. 11,325); *Potter v. Fuller*, 19 F. Cas. 1148 (C.C.N.Y. 1862) (No. 11,327); *Potter v. Stevens*, 19 F. Cas. 1184 (C.C.N.Y. 1861) (No. 11,338); *Potter v. Holland*, 19 F. Cas. 1154 (C.C. Conn. 1858) (No. 11,329); *Potter v. Holland*, 19 F. Cas. 1160 (C.C. Conn. 1858) (No. 11,330); *Potter v. Hicks*, 19 F. Cas. 1154 (court information and date not given) (No. 11,328).

<sup>205</sup> See *BISSELL*, *supra* note 7, at 87 (noting that "evidence abounds that indicates these main players also cooperated in price fixing and in other mutually beneficial policies").

<sup>206</sup> See, e.g., *Empire Sewing Machine 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 deliberations, overruled all 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 District of New York, and adjudications sustaining their rights").

<sup>207</sup> *Empire Sewing Machine Co.*, 19 F. Cas. at 1147.

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.<sup>208</sup>

The Sewing Machine Combination was also vehemently attacked in court and in the popular press as a “grinding, pitiless monopoly.”<sup>209</sup> Indeed, infringers counter-claimed in their lawsuits that the Combination’s war chest represented “oppressive conduct,”<sup>210</sup> but such arguments fell on deaf ears in the courts.<sup>211</sup> However, newspapers and other media outlets, which earlier delighted in reporting on the details of the Sewing Machine War, were more eager to report on or to issue such criticisms themselves. 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.”<sup>212</sup> 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.”<sup>213</sup> 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.”<sup>214</sup>

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<sup>208</sup> 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.”).

<sup>209</sup> Sara S. Thomas, *To the Editor of the Scientific American*, 28 SCIENTIFIC AMERICAN 145 (1873). See also *supra* note 5 and accompanying text.

<sup>210</sup> *Fuller*, 19 F. Cas. at 1151

<sup>211</sup> 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.”). See also Bourne, *supra* note 81, 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.”).

<sup>212</sup> *To the Editor of the New-York Times, The Sewing Machine Patent*, N.Y. TIMES, Aug. 10, 1860, at 8.

<sup>213</sup> See *Sewing Machine-Patent Extension—An Irate Opponent*, 23 SCIENTIFIC AMERICAN 41 (1870).

<sup>214</sup> *Id.* The *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.*

Despite these attacks, the Sewing Machine Combination did serve an important function of 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.”<sup>215</sup> 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.”<sup>216</sup> 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.<sup>217</sup> In addition to these free demonstrations, he performed renditions of Thomas Hood’s *Song of the Shirt*,<sup>218</sup> 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 women were incapable of working machinery, or, if they could, that it was improper and unwomanly for them to do so.<sup>219</sup> Driven by his own pursuit of fortune, and thus setting aside his own personal bigotry,<sup>220</sup> 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,

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<sup>215</sup> BRANDON, *supra* note 5, at 93.

<sup>216</sup> COOPER, *supra* note 1, at 34.

<sup>217</sup> COOPER, *supra* note 1, at 34; *see also* BRANDON, *supra* note 5, at 73; EVANS, *supra* note 5, at 89.

<sup>218</sup> *See supra* note 43 and accompanying text.

<sup>219</sup> The problem presented by this prejudice to the commercial success of the sewing machine is discussed in some detail in BRANDON, *supra* note 5, at 120-27.

<sup>220</sup> *See supra* note 182 and accompanying text.



who was hired in 1852 for solely these purposes.<sup>221</sup> 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 new business partner, Edward Clark,<sup>222</sup> 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."<sup>223</sup>

In addition to his innovative marketing campaign, Singer and Clark also pioneered novel business practices to increase the 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.<sup>224</sup> In response to this problem, Clark invented a new business method for selling their sewing machines: the installment-purchase program. 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.<sup>225</sup>

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 Machines. In combination with Singer's

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<sup>221</sup> BRANDON, *supra* note 5, at 124.

<sup>222</sup> *See supra* note 128.

<sup>223</sup> BRANDON, *supra* note 5, at 125. The 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/lewton/high/index.htm> (last visited March 4, 2009).

<sup>224</sup> BRANDON, *supra* note 5, at 116.

<sup>225</sup> BRANDON, *supra* note 5, at 117. Cyrus McCormick had come 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 one before the harvest and a larger final one after the harvest. *Id.* at 116. Thus, McCormick's idea, while novel, was not a true rent-to-own sales program.

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 now-raging Sewing Machine War. In fact, sales of Singer Sewing Machines were dismal from 1853 to 1855,<sup>226</sup> 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. In fact, 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.<sup>227</sup> 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.<sup>228</sup>

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<sup>226</sup> I.M. Singer & Co.'s sales figures for these three years were as follows: 1853 (810), 1854 (879), and 1855 (883). See COOPER, *supra* note 1, at 40.

<sup>227</sup> BRANDON, *supra* note 5, at 118-19.

<sup>228</sup> BRANDON, *supra* note 5, at 119.

Singer and Clark's innovation in both creating a sewing machine market and then securing I.M. Singer & Co.'s place as a 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, I.M. Singer & Co. immediately began reaping the fruits of its labors. Despite the severe economic recession of 1857, the members of the Combination flourished, including I.M. Singer & Co., whose sales almost doubled from 1857 to 1858.<sup>229</sup> 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 soldiers.<sup>230</sup> During the war, I.M. Singer & Co., which was renamed the Singer Manufacturing Company in 1863,<sup>231</sup> watched its sales grow each year from 16,000 machines in 1860 to 23,632 in 1864.<sup>232</sup>

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 Co. eventually overtook Wheeler & Wilson in 1867 as the top-selling sewing machine firm.<sup>233</sup> 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 &

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<sup>229</sup> COOPER, *supra* note 1, at 40.

<sup>230</sup> See EWERS & BAYLOR, *supra* note 2, at 39-42.

<sup>231</sup> After forming their business partnership in 1851, *see supra* note 128, 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 5, at 86, 91.

<sup>232</sup> See COOPER, *supra* note 1, at 40.

<sup>233</sup> See COOPER, *supra* note 1, at 40.

Co., which sold 108,997 machines that year.<sup>234</sup> 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 machines, and the company controlled 75% of the world market for sewing machines.<sup>235</sup> 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 I.M. Singer & Co., it was largely responsible for the success of the American sewing machine industry writ large. 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.<sup>236</sup>

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<sup>234</sup> See COOPER, *supra* note 1, at 40.

<sup>235</sup> See BISSELL, *supra* note 7, at 88.

<sup>236</sup> See BRANDON, *supra* note 5, at 111.

## V. 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. This historical patent thicket challenges the principal focus of the literature on recent inventions and recent changes in patent law, such as the rise of biotech patenting since 1981.<sup>237</sup> This too-narrow focus on recent technology and innovation may be impoverishing the policy debates concerning patent thickets.

Given the cutting-edge nature of biotech research and its equally innovative commercialization,<sup>238</sup> this new field presents a moving empirical target. This explains perhaps why recently published studies on patent thickets, at best, have found none, or, at worst, have been inconclusive.<sup>239</sup> In fact, what makes the sewing machine story so salient is that the Sewing Machine War comprised 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, royalty stacking, 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.

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<sup>237</sup> See *Diamond v. Chakrabarty*, 447 U.S. 303 (1980) (holding that a 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”).

<sup>238</sup> Traditional twentieth-century methods of research and development in the pharmaceutical industry consisted of screening soil and sludge 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 (2005) (describing screening methodology). Beginning in the early 1990s, Vertex Pharmaceuticals rejected the screening process in favor of a structure-based design process in which drugs are literally built from the protein up. *Id.* at 186. Dr. Joshua Boger, founder and CEO of Vertex Pharmaceuticals, which was the first pharmaceutical company dedicated solely to structure-based design of drugs, expressed his dismay with the traditional screening methodology: “There’s nothing wrong with screening if it works. But it rarely works. And when it fails it’s a very frustrating process because you can’t do anything about it. . . . We don’t want to set up ten screening programs and hope that one of them pays out.” *Id.*

<sup>239</sup> See *supra* note 15 and accompanying text.

With respect to the role of “patent trolls” in patent thickets, and in patent litigation generally, the parallels between Howe and modern non-practicing entities are palpable. An oft-cited example of a “patent troll” at work was the recent Blackberry litigation.<sup>240</sup> In this case, the 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. As such, many commentators believe that NTP is an exemplar of a modern “patent troll,” since it was a non-practicing entity that used an injunction to compel RIM to pay for a license.<sup>241</sup> If NTP was *arguendo* a “patent troll,”<sup>242</sup> then Howe certainly was a “patent troll”—a non-practicing entity with a patent on only a few elements of a product and using injunctions to compel licenses from actual manufacturers of the completed commercial product.<sup>243</sup> But it was not necessary for the Supreme Court to redefine Howe’s remedies in order to make way for the commercialization of the sewing machine.<sup>244</sup> The Sewing Machine Combination was successfully formed in the

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<sup>240</sup> See *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282 (Fed. Cir. 2005).

<sup>241</sup> See, e.g., Lemley & Shapiro, *supra* note 114, 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 M. Magliocca, *Blackberries and Barnyards: Patent Trolls and the Perils of Innovation*, 82 NOTRE DAME L. REV. 1809, 1809-10 (2007) (noting 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).

<sup>242</sup> See Kieff, *supra* note 112, at 395-98 (arguing that the Blackberry litigation was not a result of NTP being a “patent troll”).

<sup>243</sup> The parallels between NTP and Howe are even greater on this point, because neither really was a “patent troll” in the sense of this now-popular characterization of them as non-practicing entities who did not care about manufacturing and who sought profit only through litigation-induced royalty payments. NTP was a wholly owned corporate entity of the inventor, and he had originally attempted to manufacture his patented invention, but he was unsuccessful in obtaining financing from investors in setting up shop. Similarly, 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 6, at 17. Moreover, Howe did eventually set up his own manufacturing facilities later in the 1860s, which ultimately precipitated another lawsuit—this time, between him and his earlier licensee and brother, Amasa Howe, as to the use of the word “Howe” as a trademark. See *Howe v. Howe Machine Co.*, 50 Barb. 236 (N.Y. Sup. 1867).

<sup>244</sup> See *eBay v. MercExchange*, 547 U.S. 388 (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 (C.C. Mass. 1860) (No. 6,769). But this decision was an outlier, as Howe and others received injunctions (and damages) in the many other lawsuits they filed against infringers. See, e.g., *Schenck*, 19 F. Cas. at 1184 (“[I]f the defendants are

shadow of both the injunctive relief already obtained by Howe and the injunctions being sought by the firms engaged in the Sewing Machine War.

To be clear, it bears emphasizing again the empirical merits of the Sewing Machine War and Howe's roll as a non-practicing entity in this patent thicket. This is admittedly a single patent thicket involving a single commercial product. Thus one cannot draw definitive conclusions from it about policy prescriptions for the patent system writ large. Yet this is an actual illustration of a patent thicket and its successful resolution, and thus it cannot be ignored either. At a minimum, it serves as a cautionary tale against the assumptions that dominate the current discourse concerning patent thickets and closely related policy concerns, such as the impact of incremental innovation and the role of non-practicing entities on patent policy. To wit, these are not modern phenomena that are necessarily best resolved with distinctly modern regulatory measures that restrict the property rights secured to patentees.<sup>245</sup>

One aspect of this cautionary tale is that it suggests that incremental invention of complementary elements of new technology seems to be a common feature of cutting-edge discoveries. From the sewing machine to automobiles<sup>246</sup> to airplanes<sup>247</sup> to radios,<sup>248</sup> incremental innovation seems to be omnipresent in the historical evolution of science and technology, in which researchers and inventors have continually pushed the envelope of the boundaries of human knowledge. There was even incremental innovation in the invention of the incandescent

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using the complainants' property, they ought not to use it, either in law or in morals, without compensation and without their consent.").

<sup>245</sup> See *supra* notes 28-32 and accompanying text.

<sup>246</sup> 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).

<sup>247</sup> See George Bittlingmayer, *Property Rights, Progress, and the Aircraft Patent Agreement*, 31 *J.L. & ECON.* 227 (1988) (analyzing the airplane patent pools).

<sup>248</sup> 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).

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, Edison invented the first *practical* incandescent light bulb. In fact, Edison was even sued for patent infringement by one of the earlier inventors of the light bulb.<sup>249</sup> 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.<sup>250</sup> 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 innovation to Edison's own cutting-edge work in electrical power systems.<sup>251</sup>

Heller and other scholars have given passing acknowledgements to a few of these historical examples of incremental innovation and resulting patent thickets.<sup>252</sup> Yet, in *Gridlock Economy*, the only historical patent thicket to which Heller devotes anything more than a sentence or two is the airplane patent thicket, which was also the only patent thicket that was solved through a public-ordering solution—a compulsory patent pool imposed on the patent-owners by federal legislation.<sup>253</sup> 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.<sup>254</sup> Again, the underlying assumption is that patent thickets are a property problem to which a public-ordering regulatory model is the best, if not only, solution.

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<sup>249</sup> *Consol. Elec. Light Co. v. McKeesport Light Co.*, 159 U.S. 465 (1895).

<sup>250</sup> *Id.* at 475-77 (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”)

<sup>251</sup> See generally ROBERT LOMAS, *THE MAN WHO INVENTED THE TWENTIETH CENTURY* (1999).

<sup>252</sup> See, e.g., HELLER, *supra* note 9, at 31 (“Patent thickets have threatened to strangle emerging industries ranging from sewing machines to computers.”); Miller, *supra* note 8, at 387 (“Patent litigation plagued the airplane business from 1909, when Orville and Wilbur Wright sued Glenn Curtiss.”)

<sup>253</sup> See HELLER, *supra* note 9, at 30-31.

<sup>254</sup> See *id.*

In contrast to this widely accepted picture of difficult property-owners who hold out 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 patent pools are not just theoretically possible, but have occurred in the real world. There was no Patent Reform Act of 1856 that prompted the formation of the Sewing Machine Combination by eliminating Howe’s ability to get injunctions, limiting his royalty payments, or imposing restraints on his or other patentees’ commercialization rights.<sup>255</sup> 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 relevant entitlement owners. 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.<sup>256</sup>

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<sup>255</sup> 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 discussion of regulatory takings doctrine in the nineteenth century, *see* Eric R. Claeys, *Takings, Regulations, and Natural Property Rights*, 88 CORNELL L. REV. 1549 (2003).

<sup>256</sup> HELLER, *supra* note 9, at 77 (observing that “empirical studies that prove—or disprove—our theory remain inconclusive”).

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Patent Thicket**

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