

AFD Ep 382 Links and Notes - Sewing Machines [Bill/Kelley/Rachel] Recording June 12, 2021

- Intro: While textile weaving mills are one of the things most closely associated in the popular imagination when discussing the Industrial Revolution, it's time that we look at the next stage of the process. After the textiles or fabrics have been woven on a loom, whether in a factory or at home by hand, they still need to be assembled together into clothing, or food sacks, or ship's sails, or whatever else. Or maybe you have a textile that will be used in a single piece as a curtain or a carpet, but it looks boring right now, or lacks decorative texture. Well, in either of these scenarios, you're going to want to use the prehistoric human technology of sewing one thing to another thing with some kind of needle and a stitching material like thread. And if you're at the dawn of the industrial revolution with the rise of mechanization happening all around you, it would certainly be great if you could sew those things together with less physical effort, faster, less expensively, and more repeatably with consistency. Fortunately, in the early 19th century, sewing joined weaving on the mechanization stage with the invention of viable, widely adoptable sewing machines, first for industrial uses and then for home use by ordinary consumers. This development during the first Industrial Revolution radically changed the game for most people involved with the craft of sewing, either as seamstresses and tailors or as a home hobby or cottage industry producer. And then the field revolutionized yet again for basically everyone as one company emerged into the second industrial revolution as the industry giant for the production and sale of the sewing machines themselves, blazing a new trail not only for the clothing industry, but also the consumer credit sector and the arena of multinational American corporations.
- **NOTE: We're not going to get into the 20th century era for sewing machines in this episode.**
- [Bill] Pre-Civil War sewing machines of the 18th and early- to mid-19th centuries:
 - 1755 patent in the UK for a mechanical device to assist in sewing
 - 1790 Thomas Saint (UK) designed but failed to proliferate a sophisticated sewing machine for difficult leather and canvas stitching that needed precision. It was successfully built from his designs with minor refinements over 80 years later during the Second Industrial Revolution
 - 1790-1830s: Various British and Austrian sewing and embroidery machines
 - 1830 [Britannica]: Barthélemy Thimonnier invents the first widely used sewing machine intended for practical, mechanical replacement of hand-sewing. His crucial first major client is the French Army under the newly installed July Monarchy. His factory was torched by 1831 by rioting tailors who feared the labor-saving potential of the machines might lead to job losses.
 - 1832: American innovators begin releasing their own designs for sewing machines.
 - 1846 [Britannica]: Elias Howe in Massachusetts patented a specific sewing machine design. After extensive patent theft lawsuits amongst various inventors and industrialists, the matter was resolved in 1856, half a decade before the American Civil War, through the use of a privately organized (not government-ordered) "patent pool." I had not heard of this before, so I looked it up [on the website of the World Intellectual Property Organization](#): "Patent pools can be defined as an agreement between two or more patent owners to license one or more of their patents to one another or to third parties. Often, patent pools are associated with complex technologies that require complementary patents in order to provide efficient technical solutions. Generally, these patent pools cover mature technologies. Pools also frequently represent the basis for industry standards that supply firms with the necessary technologies to develop

compatible products and services. In that case, they rather concern technologies that are yet to be fully developed.” The idea here with the antebellum sewing machines was that it would enrich everyone a lot more to share some of the design and parts patents and standardize the industry so that it could take off rapidly. If you hold the patent to one part of a sewing machine and someone else holds the patent to another part, neither of you is going to be able to combine them into a useful new design except through costly licensing fees, unless you’ve pooled your patents to share the benefits. This impasse situation of overlapping patents on component elements of a bigger thing is called a “patent thicket,” and this was the first big one. Patent pools today can be controversial because they are essentially collusion between competing companies, even if they might be good on balance. If you want to learn more about the Sewing Machine War of the 1850s in the patent system and courts, [Arizona Law Review published a paper in 2011 on it](#), except that it’s arguing from a conservative perspective favoring less interference by the government in overlapping patent disputes. One of the parties to the patent pool agreement in 1856 was Isaac Merritt Singer, founder of the Singer Sewing Machine Company, who had entered the market in 1851.

- By 1860, the year before the American Civil War broke out, annual US production of sewing machines had surpassed 110,000 units.
- [Rachel] Basic design summary:
 - [Britannica](#)
 - Hunt (1832-34, never patented) and Howe (patented in 1846): Both machines used a curved needle that moved through the fabric, which interlocked with a second thread moved by a shuttle running back and forth on a track (lockstitch). Howe’s machine held fabric vertically and was powered by handcrank.
 - Singer’s machine has a lot of the features that would be familiar to today’s consumers: vertically-mounted needle, a foot to hold the fabric in place, even the foot treadle to power the needle’s action and leave both hands free to control the fabric. Singer also used a falling shuttle to form the chainstitch.
 - Wilson invented the rotating hook mechanism to create the lockstitch. The machine that he invented in partnership with Wheeler was quieter and smoother. Wilson also invented the “four-motion feed” used today. These innovations made his machines the best-sold of the 1850s and 60s.
 - “four-motion feed mechanism” also known as “drop feed” uses “feed dogs” to move the material past the needle. They move up to grip the fabric, forward to move the material, down to release the fabric, then back. While the needle is in the fabric, the dogs are down.
 - Singer’s early machine used the foot treadle (a technology used since the Middle Ages) to power the machine. Steam-powered machines were used as early as the 1850s to produce men’s clothing (as stated in last week’s episode). The first electric sewing machines were introduced in 1889 by Singer.
 - https://en.wikipedia.org/wiki/Sewing_machine#Design
- [Kelley] 1856 into Post-Civil War/Second Industrial Revolution sewing machines (in particular Singer Sewing Machines):
 - https://en.wikipedia.org/wiki/Isaac_Singer & https://en.wikipedia.org/wiki/Singer_Corporation
 - Singer: US Multinational corporation (MNC) pioneer?
 - The founder of the company was [Isaac Merritt Singer](#).

- Born in upstate NY in 1811. Left home at the age of 12 to take odd jobs and travel with a troupe of actors.
- Had at least 22 children with different partners. At one time he had families with at least three women, not all of whom knew about another - and he was married to another.
- Invented the first practical sewing machine and established the first MNC.
- In 1850, Singer was establishing himself as an inventor in Boston and a machinist asked him to help improve the sewing machine he had - a machine from Lerow and Blogdett Company.
- Like Rachel discussed, Singer's improvement was to add a presser foot for feeding the fabric and an arm-like apparatus that held the needle over the workspace; this reduced thread breakage and increased stitches per minute.
- He personally got pushed to a more passive, quieter role in the company due to his extremely messy, scandalous home life, but the company continued to soar, including well beyond his death
- [Brief timeline to give you a sense of the rate of growth](#). We'll talk more later on about the manufacturing technology that made this possible.
 - 1851 - Singer obtains first sewing machine patent.
 - 1855 - Won first prize at Paris World Fair - introducing Singer to European markets.
 - 1860 - Company is the largest manufacturer of sewing machines in the world.
- As a result of all this growth, Singer needed another manufacturing facility, and [chose Scotland](#) because of their cheap labor, iron, and access to ports.
 - In 1867, they opened up operations in Scotland.
 - In 1873, they opened up an even bigger factory.
 - In 1882, they opened up their factory in Clydebank - made of two buildings 800ft x 50ft with a marquis clock tower in the middle. These factories were equipped with railway lines within the factory, fireproof materials, and a sprinkler system, making it the most modern factory in Europe. The three original stories were soon expanded to six stories. The buildings were in use until 1980 and destroyed in 1998.
- [Singer expanded rapidly throughout the world](#).
 - By 1882 they were in: Australia, New Zealand, Belgium, Switzerland, Germany, Austria-Hungary, France, Great Britain, India, Ireland, Italy, The Netherlands, The Ottoman Empire and Balkans, Philippines, Portugal, Russia, South Africa, Scandinavia, Spain and Portugal, United Kingdom.
 - In the early 1900s the entered Japan.
 - *Singer enjoyed a global market share of a little less than one-quarter in the mid-1870s. However, by 1912 this had increased to "60 percent of the family sewing machines in America, and probably 90 percent in foreign markets," an exceptional degree of market control.*
- [Bill] Mass production through interchangeable parts was another key to success

- See our [episode #380](#) last week! This kind of growth and volume is simply not possible if you are making machines “from scratch”. Instead, Singer relied on templates, interchangeable parts, and assembly lines.
- This cut Singer’s costs, boosted profits, and allowed production at a scale necessary to supply a home consumer market, not just enterprise.
- The interchangeable parts also allowed machines to be serviced and repaired, a cornerstone of Singer’s marketing and customer service strategy.
- Singer’s production rose from about 2,500 machines to 13,000 machines in 1860. By 1876, the year after the founder’s death, the company had sold its 2 millionth machine. By the mid-1880s, the company was producing some 8,000 machines per week in one Scottish factory alone. That factory went on to make 36 million sewing machines by the 1940s.
- It also simply allowed him to make smaller machines for the home instead of for industrial factories or other businesses
- Consumer market: In addition to improving the actual sewing machine, much of Singer’s innovation was in [how the company marketed the machine](#).
 - Like Bill mentioned - Singer actually shared the patent with three other groups - so their initial dominance was not purely a matter of them having the best technology, they had the best manufacturing, distribution, and marketing systems.
 - Sewing machines were initially too expensive for most families, so Singer’s business partner, Edward Clark, came up with the idea of “rent to own” to allow families to access the machines.
 - Consumer credit: Inexpensive machines + financing plans for mass market buyers
 - \$10 machines on installment plans instead of \$100 machines
 - Rent-to-own scheme: https://en.wikipedia.org/wiki/Singer_Corporation#Marketing
 - They also hired agents to help you set up the machine and call back to make sure that it was working. This was in part because they needed agents going around to collect the monthly payment from families on rent to own plans.
 - [Other marketing improvements included](#): fancy showrooms, buying used sewing machines to prevent secondary market, a centralized business structure, and aggressive international growth.
 - But perhaps the most significant marketing strategy was to market directly to women.
 - The company used direct to consumer advertising, which was emerging after the Civil War as ad agencies began to set up shop to create ad campaigns and generate new demand:
 - *For a flavour of the attitudes Stanton was up against, consider two cartoons. One shows a man asking why you would buy a "sewing machine" when you could simply marry one. In another, a salesman says women will get more time to "improve their intellects!" The absurdity was understood.*
 - Singer advertised their machines by stating that women with a machine could make over \$1,000/ year with the machine (promoting financial independence) and even said they would sell directly to the woman of the family.

- [New York Times article from 1860](#) on the invention of the sewing machine:
 - *No one invention has brought with it so great a relief for our mothers and daughters as these iron needle-women. Indeed, it is the only invention that can be claimed chiefly for woman's benefit. The inventive genius of man, ever alert to furnish the world with machinery for saving labor and cheapening the cost of manufactures, seemed to regard man as the only laborer, prior to the invention of the sewing machine. The carpenter, with his planing, matching, and other machinery, was relieved from the drudgery of his trade, but, on returning home at night, found no labor-saving machinery to relieve his wife in her toil with the needle. The farmer, with his reaper, and threshing machine, gathers his harvest and prepares his grain for market with ten times the rapidity and ease that he could before these were invented; but his companion and helpmeet found no machinery to speed her labor and ease her toil, until the advent of the sewing-machine. For a long time has machinery been employed in the different walks of life to emancipate man from exhausting toil, to quicken the wheels of commerce over land and sea; and instead of depriving the laborer of work, it has opened new fields of enterprise and led thousands into the road to wealth.*
 - [Bill] Fascinatingly, these home machines actually created a new labor market almost out of thin air. Women and girls stuck in the home who could not for whatever reason get a mill job could now be trained to produce marketable piece work from home with sewing machines supplied by charitable wealthy women's organizations. While obviously hand-stitched items had long been a cottage industry for probably almost as long as sewing has existed, Singer home machines made 900 stitches per minute. This was vastly faster (and thus more marketable product) than what someone could produce by hand.
 - [Bill] [Isaac Singer](#) was one of the early, smaller-scale tycoons of the Second Industrial Revolution, dying in 1875 with a fortune of \$13 million in the money of the time. That's [over \\$300 million](#) in today's money. For comparison, however, Cornelius Vanderbilt died in 1877 with about \$105 million, which today would be worth [over \\$200 billion](#).
 - [Bill] For a while in the 1850s and 1860s before Singer became the dominant player, Wheeler & Wilson were the biggest sewing machine producers after developing the technology for the "four-motion feed mechanism" which could smoothly sew forward, back, up, and down, thus allowing for very complicated, tight stitching around things like buttonholes. But as a good example of the 1850s "patent thicket" mentioned earlier, a different inventor held the specific patent for lateral-motion sewing in a sewing machine for use in stitching buttonholes. Wheeler & Wilson were part of the patent pool agreement of 1856.
 - [Rachel] Industrial market: Sewing machines continued to revolutionize industrial production, not just home sewing, because factories could mass-produce finished, off-the-rack clothing for department stores and other standardized consumer markets both cheaply and quickly. https://en.wikipedia.org/wiki/Sewing_machine#Market_expansion
 - As noted at the beginning, we're not going to get into the 20th century era for sewing machines in this episode. That would start us getting too far off-topic for today as the

machines got more complicated and started moving toward computerization and electronic components. Many older mechanical sewing machines before these gizmos were added had working lifespans of up to a hundred years, i.e. well into the 20th century, back before the [Planned Obsolescence](#) days.

- https://en.wikipedia.org/wiki/Sewing_machine
- <https://www.britannica.com/technology/sewing-machine>