

The Patent System during the Industrial Revolution: Was it effective to spur innovation?

The Industrial Revolution (IR) is a significant point in history that has spurred economic growth and generated new jobs for many. During this period of growth, many countries such as the United States, the United Kingdom and other European nations embraced innovation in creating new technologies that could enhance lives and flourish the economy¹². One way to encourage such innovation was the patent system. First established in Venice in 1474³, primarily to encourage new inventive devices and help seek protection against infringers in the field of glassmaking, it has been adopted by other countries and among countries, has been enshrined in the Constitution of the United States (US). Aimed to entice new inventions through the use of incentives, the US patent act was first established in 1790⁴ under the direction of then President George Washington to provide exclusive rights to inventors for 14 years and was improved in 1836⁵ to streamline the registration process and increase the patent period to 17 years. During the first and second IR specifically, the patent system allowed the US to become home to many innovations that improved lives, thrived the economy and expanded the boundaries of technological innovation such as through the invention of the telegraph, lightbulb and the telephone. A salient question to ask would be "Was the patent system effective?". In this essay, I will explore the pros and cons of the US patent system during the 1800s by analyzing the case studies of the telephone controversy and the "War of the Current", proceeding to argue that the patent system was not fully effective in enabling the full extent of innovation to flourish.

¹ Mokyr, Joel. "Intellectual Property Rights, the Industrial Revolution, and the Beginnings of Modern Economic Growth." *The American Economic Review*, vol. 99, no. 2, 2009, pp. 349–55. *JSTOR*, <http://www.jstor.org/stable/25592423>. Accessed 7 Apr. 2023.

² Bottomley, Sean, 2014. "Patents and the first industrial revolution in the United States, France and Britain, 1700-1850," *IAST Working Papers 14-14*, Institute for Advanced Study in Toulouse (IAST).

³ Ted Sichelman and Sean O'Connor, *Patents as Promoters of Competition: The Guild Origins of Patent Law in the Venetian Republic*, 49 *SAN DIEGO L. REV.* 1267 (2012), <https://digitalcommons.law.uw.edu/faculty-articles/201>

⁴ *Patent Act of 1790* .

https://ipmall.law.unh.edu/sites/default/files/hosted_resources/lipa/patents/Patent_Act_of_1790.pdf.

⁵ Wyman, William I. "The Patent Act of 1836." *Journal of the Patent Office*

Proponents of the US patent system argue how many inventions resulted from the rights given to inventors to innovate new products and profit from them. This is evidenced by the many innovations patented during this period⁶. In fact, its patent system was rather robust in verifying its novelty, undergoing multiple consultations from engineers and technical experts⁷. This process while it took long and knowledge but the help of patent attorneys and the simplification of the registration process in 1836 ensured a safe haven for inventors to innovate and even uplifted communities such as the enslaved Black Americans⁸. This system perhaps led to prominent scientist Thomas Edison amassing 1093 patents⁹ to his name, the highest number in US history from the automatic telegraph¹⁰ to the invention of the lightbulb¹¹. As a matter of fact, some of his findings such as an improved carbon transmitter were adopted and modified in successfully inventing the telephone. Had such a system to safeguard the rights of his invention not existed, it seems unlikely that Edison would have been incentivised to create multiple novel inventions that have cumulatively helped other technologies develop too. Through the patent system, more innovations were created and this has led to US prominence in technological advancements.

Despite its noble intentions to spur innovation, the patent system, however, failed to unleash its maximum potential for innovation. One example can be witnessed from the controversy surrounding the invention of the telephone between Alexandra Graham Bell and Elisha Gray in 1876. Both filed an application for the invention of the telephone on the same day and despite

⁶ "Significant Historical Patents of the United States." *Historical U.S. Patent Collection by Jim Bieberich*, www.uspat.com/historical/.

⁷ Khan, B. Zorina. "Property Rights and Patent Litigation in Early Nineteenth-Century America." *The Journal of Economic History*, vol. 55, no. 1, 1995, pp. 58–97. JSTOR, <http://www.jstor.org/stable/2123768>. Accessed 7 Apr. 2023.

⁸ ROUSSEAU, PETER L. "The Democratization of Invention: Patents and Copyrights in American Economic Development, 1790–1920. By B. Zorina Khan. New York: Cambridge University Press, 2005. Pp. Xvii, 322. \$60.00." *The Journal of Economic History*, vol. 66, no. 3, 2006, pp. 842–844., doi:10.1017/S0022050706300344.

⁹ 115. "Patent Listing." *Patent Listing*, edison.rutgers.edu/life-of-edison/edison-s-patents/patent-listing.

¹⁰ "US173718A - Improvement in Automatic Telegraphy." *Google Patents*, Google, patents.google.com/patent/US173718.

¹¹ "US223898A - Electric Lamp." *Google Patents*, Google, patents.google.com/patent/US223898.

Gray submitting the documents earlier, Bell was awarded the patent due to his attorneys paying the registration fee and Gray only providing a caveat, which is a precursor to an actual patent. In this dispute, despite the uncanny similarities in their designs, the burden of proof was laid on Gray to prove, for which he was no match to Bell and his prominent attorneys who had substantial funding. This caused Gray's hard work to be discredited despite how close he was. While it was not proven, it can be inferred that some knowledge was leaked from Gray to Bell which led to the alleged infringement. The patent system unknowingly created an individualistic culture instead of a collaborative one, where the "survival of the fittest" mindset to emerge victorious had to be adopted by inventors. Furthermore, it does not help that patents can only be attributed to only one inventor which resulted in competition to emerge first. Had these two worked together without the competition for first rights, I believe that the advancement of telephones could have accelerated for the greater good of the country. The profit-driven need to appease investors led to Bell and his company focusing his post-patent years to successfully kill the 600 attempts of nullifying his patent from civil lawsuits to congressional investigations including from Gray throughout the 17-year patent period that resulted in Western Union's demise in the telephone industry¹². These resources of money, time and effort were unnecessarily wasted which could have been channeled to progress the capabilities of the telephone. Thus, while the system tried to spur innovation, the cut-throat nature omnipresent did not foster a collaborative environment that disabled information sharing among inventors which might have pushed the bounds of innovation quicker.

Another key milestone in history that further highlights how protecting the interests of profits was prioritized over new and improved technology would be the "War of Currents"¹³. Edison, who invented Direct Current (DC) sparred with Nikola Tesla who found Alternating Current (AC) regarding which should be widely adopted. Edison's discovery of the lightbulb and DC in 1878 was only possible due to generous investments by prominent financiers such as JP Morgan

¹² Brown, Benjamin Lathrop. "The Bell versus Gray Telephone Dispute: Resolving a 144-Year-Old Controversy [Scanning Our Past]." *Proceedings of the IEEE*, vol. 108, no. 11, 2020, pp. 2083–2096., doi:10.1109/jproc.2020.3017876.

¹³ "How Edison, Tesla and Westinghouse Battled to Electrify America." *History.com*, A&E Television Networks, www.history.com/news/what-was-the-war-of-the-currents.

and the Vanderbilt family¹⁴ and he was threatened by the prospect of losing to AC, which was deemed safer. In retaliation, Edison proceeded to discredit the use of AC by launching a propaganda campaign claiming AC was dangerous and advocated for its use to execute capital punishment, through an employee secretly under his payroll. He further tried to use AC to electrocute an elephant¹⁶ to prove his point and garner hatred towards adopting AC. Interestingly, Tesla used to be an employee in Edison's company but left to work with George Westinghouse, their competitor, after a fallout due to a lack of recognition and remuneration offered when helping Edison with some of his research that was eventually patented¹⁷. This shows how Edison, fundamentally a businessman first, was more concerned with making money than embracing new innovation or giving due credit to his team. This shows how despite the best efforts to spur innovation, the patent could not protect against spear campaigns orchestrated by inventors such as Edison and Bell who were motivated by the need to satisfy investors and being known for their inventions, delaying advancements in these areas of innovation.

The above puts forth how the patent system started with genuine intentions by its founding fathers to motivate inventors to innovate by providing them rights to monopoly for 14 to 17 years. This did indeed increase the number of inventions created and patented, even uplifting the inventors and the country. However, its utility was limited as it failed to protect against inventors who turned into businessmen and seeking to protect their business interests and who would do anything to cut off or limit competitors as in the case of Bell and Edison, signaling the ineffectiveness of the patent system in realizing the full potential of innovation. It is my humble belief that had these brilliant inventors collaborated instead of pitting against each other, mankind would have benefited immensely from the faster pace of innovation that would have been achieved.

¹⁴ "The American Experience | Edison's Miracle of Light | Program Description." *PBS*, Public Broadcasting Service, www.shoppbs.pbs.org/wqbh/amex/edison/filmmore/description.html .

¹⁵ "Thomas Edison: Facts, House & Inventions - History." *History.com*, A&E Television Networks, www.history.com/topics/inventions/thomas-edison .

¹⁶ Michael Daly, *Topsy: The Startling Story of the Crooked Tailed Elephant*, P. T. Barnum, and the American Wizard, Thomas Edison (New York: Grove Press, 2014), 282

¹⁷ Šarboh, Snežana. "The Patents of Nikola Tesla." *World Patent Information*, Pergamon, 15 Jan. 2010, www.sciencedirect.com/science/article/pii/S0172219009001367.