



## Do Patents have a ‘Chilling Effect’ on the Incentives for Research and Development?

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Links to full papers by Howells and Katznelson treating four historical cases of patents in development (available on event website).

[Henry Ford and the "Overly-Broad" Selden patent](#)

[Aviation patents](#)

[Debunking the Myth that the Wright brothers' patent held-up early US aviation development](#)

[Did the patent thicket in early US radio hold-up radio development?](#)

[Invention around Edison's incandescent lamp patent](#)

### 1. Erroneous historical accounts that allege that patents retard development have been influential on patent scholarship and policy-orientated work.

Erroneous historical accounts of the role of patents in the development of aviation, incandescent light, the automobile and radio have persuaded patent scholars and government agencies that pioneer patents of broad scope hinder or block downstream technology development;

“For a few notable commercial product inventions - Edison’s incandescent lamp and the Wright brothers’ airplane stabilization and steering system - broad pioneering patents were exercised in a manner that at least temporarily deterred competitors from making further improvements. The patent holders either aggressively enforced their rights or refused to enter into licensing agreements. Radio illustrates the possibility that when separate patent holders with broad enabling patents (in this case, Marconi Company, De Forest, and De Forest’s main licensee, AT&T) cannot agree on licensing terms technological progress may be impeded for a time.”

*Merrill, SA, Lewin, RC, Myers, M. eds., “A Patent System for the 21st Century.” Washington DC: National Research Council of the National Academies: Committee on Intellectual Property Rights in the Knowledge-Based Economy, Board on Science, Technology, and Economic Policy, Policy and Global Affairs Division, 2004 p25-26.*

Patent scholars Merges and Nelson review the alleged evidence in these cases and,

'...we come out with the belief that the granting and enforcing of broad pioneer patents is dangerous social policy. It can, and has, hurt in a number of ways....And there are many

cases where technical advance has been very rapid under a regime where intellectual property rights were weak or not stringently enforced. We think the latter regime is the better social bet.”

*Merges, Robert P, and Richard R Nelson. "On Limiting or Encouraging Rivalry in Technical Progress: The Effect of Patent Scope Decisions." Journal of Economic Behavior and Organisation 25 (1994), p16. See also: Merges, Robert P, and Richard R Nelson. "On the Complex Economics of Patent Scope." Columbia Law Review 90, no. 4 (1990).*

Merges and Nelson’s review of the empirical evidence in these cases is cited in support of similar conclusions by others;

‘licensing negotiations may be lengthy and costly or break down due to differences in valuations’ (Federal Trade Commission 2003p19).

*Federal Trade Commission, To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy. Washington DC: Federal Trade Commission, 2003, p19*

‘It is by no means clear that patent protection is always either necessary, or sufficient, to ensure investment in innovation.’

*Spence, M. "Policy," in The Modern Law of Patents, ed. A Roughton, T Cook and M Spence London Lexis Nexis Butterworths, 2005, p11.*

‘These facts suggest some theoretical limitations to the patent apologists’ arguments’

*Liebowitz, S. "Inventing a Nonexclusive Patent System." Yale Law Review 111, no. 8 (2002), p2251.*

Congressional Research Service (CRS) reports to Congress are reports intended to brief members of Congress on the factual background to policy issues; Schacht cites the 1990 paper’s conclusions finding that.

‘in a situation where only “a few organisations controlled the development of a technology, technical advance appeared sluggish”

*Schacht, WH, Federal R&D, Drug Discovery, and Pricing: Insights from the Nih-University-Industry Relationship. 2006, p9. Also in Schacht, WH, and JR Thomas, Follow-on Biologics: Intellectual Property and Innovation Issues. 2008, p18*

Jon Soderstrom, President of the Association of University Technology Managers and Managing Director of the intellectual property management and licensing office at Yale University introduced his testimony to the Subcommittee on Courts, the Internet and Intellectual Property by citing the Heller and Eisenberg speculation that a patent-induced anti commons might exist in biotechnology and Merges and Nelson’s 1990 paper for the possibility that,

‘the assertion of patents on only one or two key upstream, foundational discoveries may significantly restrict follow-on research.’

*Subcommittee on Courts, the Internet and Intellectual Property of the Committee on the Judiciary House of Representatives. "Stifling or Stimulating - the Role of Gene Patents in Research and Genetic Testing," First Session, 30th October 2007.*

## 2. The Wright brothers' patent

A [review](#) of the 2014 book “Birdmen” on the Wright brothers concluded,

“[Orville Wright was a] vindictive SOB whose greed and begrudgery [sic] were surpassed only by those of his brother Wilbur... [the brothers were] cursed with an addiction to malice to anyone who challenged their primacy or stood in their path to riches” (Cooke 2014)

Cooke, Patrick. "Book Review: 'Birdmen' by Lawrence Goldstone," *Wall Street Journal* 2014. [Review of "Birdmen" by Lawrence Goldstone](#)

The purported tool of the Wright brothers' “malice” was, of course, their patent. The lesson for today is erroneously drawn by the author of “Birdmen”, [Goldstone](#);

“In something of an irony, the patent system, designed specifically to promote and protect innovation, has never been particularly adept in dealing with new technologies... Patent law remains [today] the damper on innovation that it was when airplane development was nearly grounded in its infancy”

Goldstone, Lawrence. *Birdmen - the Wright Brothers, Glenn Curtiss and the Battle to Control the Skies*. Ballantine Books, New York, NY, 2014.

There is continuity here with the view expressed 99 years ago in early 1917 when U.S. Government officials stated that the assertion of the Wright airplane patent was,

“injurious to the development of aircraft and the aircraft industry in the United States”

*Naval Affairs Committee, U.S. House Committee on Naval Affairs, Hearings on Estimates Submitted by the Secretary of the Navy, 64th Congress. 1917, p1177-78.*

Further,

“any adequate return to the Wright stockholders upon their investment [in the Wright patent] must be through the manufacture and sale of airplanes ... and not through patent channels... any return from patents must necessarily fade into insignificance.”

*NACA (1917a), 'Minutes of Executive Committee,' National Advisory Committee for Aeronautics, Smithsonian Institution Archives, Record Unit 45, Box 94, Washington, D.C., Feb. 3, p3-4.*

The prevailing view of the Wright brothers' patent in the secondary literature is that it:

- (i) retarded the development of early US aviation and
- (ii) required government intervention to promote what is assumed to be a “patent pool” and necessary to restore development (the private sector judged unable to do so).

Johnson writes that,

“... Congress had appropriated \$US15,000,000 for the purchase of airplanes, but the patent litigation among the fifteen active manufacturers held up full production. Some like the Wright-Martin Company (the transferee of the basic Wright patent of 1906) demanded large royalties from the others. Its patience exhausted, Congress passed a statute authorizing the condemnation of all basic aviation patents and appropriated funds to compensate the owners. This threat finally brought the aircraft builders to their senses. Through the intercession of the National Advisory Committee on Aeronautics (NACA), the manufacturers were brought together in April 1917 to discuss the possibility of forming a patent pool”

*Johnson, Herbert A. "The Wright Patent Wars and Early American Aviation." Journal of Air Law and Commerce 69 (2004), p57.*

Beach asserts that,

“no manufacturer could have afforded to take that risk [of infringing the Wright patent] ... as would be expected, the consideration asked by their owners was exceedingly high... [so high, that] the “deadlock was broken by the organization of the Manufacturers’ Aircraft Association...”

*Beach, Robert Willis. "Patent Cross-Licensing Agreements and Methods of Their Administration" Journal of the Patent Office Society 19, no. August (1937), p587.*

Dykman writes:

“During 1916 and culminating in January 1917, the Government was made aware of a vexing problem that just would not solve itself. The early aeroplane manufacturers not only were the most courageous of American entrepreneurs, they were first class inventors. They also were like our present day farmers, highly individualistic - meaning they were completely self-made and intended to stay that way - by themselves. Hence, any inventions made by these pioneers were consequently not offered for use by others on anything nearly approaching a royalty-free basis. The Assistant Secretary of the Navy, during January of 1917 (The Honorable Franklin D. Roosevelt), created a committee to confer with the aeroplane patent owners and manufacturers to arrange a solution to the problem of these patent owners indulging in the well-known Mexican Stand-Off under which the Government could only lose. No one would license the other under anything like a reasonable basis. Under these conditions, anything like a workable agreement between the manufacturers would be most welcome to the Government which had a war to fight”

*Dykman, Harry T. "Patent Licensing within the Manufacturer's Aircraft Association (Maa)." Journal of the Patent Office Society 46, no. 9 (1964), p647.*

Bittlingmayer’s logjam statement is that,

“some firms were reluctant to take contracts because of the threat of patent infringement suits.”

*Bittlingmayer, George. "Property Rights, Progress and the Aircraft Patent Agreement." Journal of Law and Economics 31, no. 1 (1988), p232.*

Szakalski writes that,

“aircraft manufacturers had been unable to fulfill the Government’s aircraft orders because they were fearful of infringing [Wrights] patent.”

*Szakalski, Dustin, R. "Progress in the Aircraft Industry and the Role of Patent Pools and Cross-Licensing Agreements." UCLA Journal of Law and Technology 2 (2011), p6.*

Roland’s article alleges that,

“other builders faced the prospect of crippling royalty payments to both Wright and Curtiss. The conflict reached crisis level in December 1916, when the Wright-Martin Company, holder of the Wright patent, announced that manufacturers would have to pay a royalty of 5% on each aircraft sold, with a minimum annual payment of \$10,000 per manufacturer”

*Roland, Alex. "Pools of Invention: The Role of Patents in the Development of American Aircraft, 1917-1997," in Atmospheric Flight in the Twentieth Century ed. Peter Galison and Alex Roland Dordrecht, NL: Kluwer Academic 2000, p324-325.*

“Lawsuits and threats of suits had already frightened many manufacturers out of the field... the royalties that Curtiss was demanding for his numerous inventions... were already

making aircraft prices prohibitive. And now came the Wright-Martin demand. Just when the services wanted more airplanes than ever before, when it looked as if the United States would inevitably be drawn into the war in Europe, the nascent American aircraft industry faced an impasse.”

*Roland, Alex. Model Research - the National Advisory Committee for Aeronautics 1915 - 1958. vol. 1 Washington, DC: NASA Publication SP - 4103, 1985, p38.*

Roland judges the NACA’s role in creating the MAA Agreement would be “its finest hour in the Great War” (Roland 1985, p. 37). Hence, in his 2000 article he refers to the February 1917 formation of the Aircraft Manufacturers’ Association:

“Serious movement toward a patent pool, however, was not likely to issue from such voluntarism, at least not when a critical player such as Wright-Martin refused to participate. Instead, government had to intervene forcefully to impose an associationalist model on the entire community [of aircraft manufacturers]”

*Roland, Alex. "Pools of Invention: The Role of Patents in the Development of American Aircraft, 1917-1997," in Atmospheric Flight in the Twentieth Century ed. Peter Galison and Alex Roland Dordrecht, NL: Kluwer Academic 2000, p326.*

Merges and Nelson suggest that,

“the Wright patent significantly held back the pace of aircraft development in the United States by absorbing the energies and diverting the efforts of people like Curtiss.”

*Merges, Robert P, and Richard R Nelson. "On the Complex Economics of Patent Scope." Columbia Law Review 90, no. 4 (1990). p890-1.*

*Merges, Robert P, and Richard R Nelson. "On Limiting or Encouraging Rivalry in Technical Progress: The Effect of Patent Scope Decisions." Journal of Economic Behavior and Organisation 25 (1994), p15.*

They suggest that the U.S. Government’s intervention to create a patent pool in 1917 was necessary because,

“[t]he Curtiss-Wright dispute was the centerpiece of a larger patent logjam in the early aircraft industry” (Merges and Nelson 1990, p. 889 n212)

and that,

“[t]he situation was so serious that at the insistence of the Secretary of the Navy, during World War I, an arrangement was worked out to enable automatic cross licensing” (Merges and Nelson 1990, p. 891; Merges and Nelson 1994, p. 15)

Heller’s thesis is that private property rights can generate a “gridlock” halting development and a primary instance is the Wright-Curtiss litigation;

“A second form of gridlock [that] almost ended flight in its earliest days – and has echoes in current tragedies of the anticommons... Everyone owned a piece of the plane, but they could not agree on licensing terms”

*Heller, Michael. Gridlock Economy - How Too Much Ownership Wrecks Markets, Stops Innovation and Costs Lives. New York, NY: Basic Books, 2008, p30*

Heller continues by stating that U.S. airplane development was “seriously retarded” by the patent situation and,

“Because of the patent tangle, the American aeronautics industry ground to a halt... Domestic airplane manufacturing gridlock had become a national security crisis... “[w]e

have air travel because of legal luck and political will... Legislators could look to Europe to see what airplanes could do if gridlock were solved” (Heller 2008, p. 31).

The historian of aviation, Elsbeth Freudenthal explained that the aircraft patent disputes,

“...had hampered the practical development of the new invention... [and] had kept American aviation at half speed.”

*Freudenthal, Elsbeth Estelle. The Aviation Business: From Kitty Hawk to Wall Street. New York: The Vanguard Press, 1940, p14-16.*

A popular historian, Phil Scott, blames the weakened condition of the U.S. aircraft industry on the fact that the Wright brothers were seeking patent royalty fees;

“For most manufacturers,” he notes, “any fee at all was prohibitive, and so only a few companies sprouted and they survived only weakly.”

*Scott, Phil. The Shoulders of Giants: A History of Human Flight to 1919. Reading, MA: Addison-Wesley, 1996, p256.*

### **3. Edison’s 223,898 Incandescent Lamp Patent**

Edison’s 223,898 patent is commonly-mischaracterized as

“covering the use of carbon filament as the source of light” (Merges & Nelson, 1990, 885)

This is likely the source of much folklore about the broad scope of Edison’s patent – the idea that Edison “invented the light bulb,” that his patent was so basic as to,

“block others from entering the market”

*Liebowitz, S. "Inventing a Nonexclusive Patent System." Yale Law Review 111, no. 8 (2002), p2253.*

And,

“limit post-patent innovation”

*Carrier, M.A. "Unraveling the Patent-Antitrust Paradox." University of Pennsylvania Law Review 150, no. 3 (2002), p830.*

and that during the enforcement of the patent, competition

“suddenly became impossible”

*Bright, Arthur A. The Electric Lamp Industry. New York: Macmillan, 1949, p89.*

and,

“filament development and lamp development more generally virtually stagnated” (Merges & Nelson, 1994, 15).

#### 4. The Selden patent and Ford Motor Co. litigation

The Forbes article entitled [“The Father of All Patent Trolls”](#) is a reference to George Selden and his early automobile patent No. [549,160](#). Snow writes,

“Patent trolls feed particularly voraciously on technology firms; Apple and Google are currently spending more on patent litigation than on research. The situation is strongly reminiscent of what happened a century ago, when a particularly audacious troller [the Selden patent owner] beset another new technology. The result was a years’ long lawsuit that *stifled the infant automotive industry*” (our emphasis).

*Snow, Richard. “The Father of All Patent Trolls,” Forbes, July 30th 2013.*

The Selden patent is the classic example of a current policy concern often generalized without citation to specific examples. For example, the FTC 2003 report stated that,

“A poor quality or questionable patent is one that *is likely invalid or contains claims that are likely overly-broad*. Hearings participants raised concerns about the number of questionable patents issued. Such patents can block competition and harm innovation in several ways” (our emphasis).

*Federal Trade Commission, To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy. Washington DC: Federal Trade Commission, 2003, p5.*

Economists have expressed similar concerns;

“A... worrisome development has been the emergence of individual inventors who seek to “hold-up” established firms in their industries. In many cases, these individuals have received a patent *of dubious validity, often with overly broad claims* [our italics]. Yet established players have often chosen to settle such disputes, not wishing to risk the uncertainty associated with submitting a complex piece of intellectual property to trial.”

*Jaffe, Adam B, and Josh Lerner. Innovation and Its Discontents: How Our Broken Patent System Is Endangering Innovation and Progress and What to Do About It. Princeton, New Jersey: Princeton University Press, 2004, p15.*

#### 5. Radio: Fleming’s diode and De Forest’s triode patents as “blocking” patents

There are many metaphors used to characterise the scenario of continued development in the context of multiple, important patent rights held by multiple independent owners but it is common to raise the theoretical possibility that this context increases the chance of some form of development holdup. See for example the “...*patent thicket*: an overlapping set of patent rights” (Shapiro 2001, p. 119); the possibility of “Patent Holdup and Royalty Stacking” (Lemley and Shapiro 2007); it has been called an “anticommons” (Heller and Eisenberg 1998, p. 698); similarly the scenario has been called “fragmented invention” (Hall and Harhoff 2012, p. 11).

Early radio presents an empirical example of such a distribution of patents. An alleged empirical case of development holdup is that between the Fleming diode and De Forest triode patents and caused by the decision of a court in 1916;

“[T]he court holding that the Fleming patent dominated the use of a vacuum tube *either as a detector, repeater, amplifier, or oscillator* [our italics]. As a result of this decision the De

Forest Co. ceased manufacturing vacuum tubes in their improved form and the Marconi Co. was limited to the manufacture of the two-element tube, which was incapable of performing all the functions of the modern vacuum tube.”

*Federal Trade Commission, Report of the Federal Trade Commission on the Radio Industry in Response to House Resolution 548, 67th Congress, 4th Session. Washington DC: GPO, 1924, p26.*

An early radio history by Archer mischaracterizes the decision as follows;

“The conclusion was that the deForest [sic] invention had infringed that of Fleming, hence that he could not manufacture the three-electrode [triode] without the consent of the Marconi Company... since it included two elements of the Fleming patent”

*Archer, Gleason L. History of Radio to 1926. New York: American Historical Society, 1938, p135.*

Maclaurin’s leading monograph on the history of radio taught similarly;

‘The court decided that De Forest had infringed the two-element Fleming vacuum tube, while Marconi had infringed the three-element De Forest patent. Neither company could manufacture the triode’

*Maclaurin, WR. Invention and Innovation in the Radio Industry. New York: Arno Press and the New York Times, 1971, p85.*

Three other post-1945 historians of radio cite *Maclaurin’s* narrative of the 1916 decision rather than the true content of the decision itself: Douglas cites Aitken, and Aitken and Reich cite Maclaurin (Douglas 1987p289; Aitken 1985 p248; Reich 1977p216; Reich 1985, p. 220). A fifth, the Naval communications historian Howeth, cites the decision directly but expresses the same interpretation,

“Neither Marconi nor De Forest nor any other company could legally manufacture the badly needed three-element tube without the mutual consent of the two interested parties”

*Howeth, Linwood S. History of Communications-Electronics in the United States Navy. Washington: US Government Printing Office, 1963, p374.*

Finally, legal scholars have accepted and cited to these early errors in interpretation of the 1916 decision: Kitch cites Maclaurin’s interpretation of the decision (Kitch 1977, p. 269) and Merges and Nelson cite the FTC report (Merges and Nelson 1990, p. 892) and Merges cites to Reich’s 1985 book (Merges 1994, p. 85-87).

## **6. Government policy statements on patents are consistent with the erroneous historical narratives that patents harm innovation**

In a recent White House report on the subject of patent law, President Barack Obama is quoted as saying that certain patent holders, so-called patent assertion entities,

“...don’t actually produce anything themselves. They’re just trying to essentially leverage and hijack somebody else’s idea and see if they can extort some money out of them”

*Executive Office of the President, Patent Assertion and US Innovation, White House, Washington: 2013, p2.*

The U.S. government alleges that patent “trolls” are responsible for a patent litigation crisis and the White House recently announced executive actions for “taking on patent trolls.”



“There are a growing number of companies, commonly called ‘patent trolls,’ who employ these litigation tactics as a business model — costing the economy billions of dollars and undermining American innovation. In the last two years, the number of lawsuits brought by patent trolls has nearly tripled, and account for 62% of all patent lawsuits in America. All told, the victims of patent trolls paid \$29 billion in 2011, a 400% increase from 2005 — not to mention tens of billions dollars more in lost shareholder value”

*Sperling, Gene. "Taking on Patent Trolls to Protect American Innovation", White House Briefing Room 2013, June 4th.*

The UN Secretary-General's High Level Panel on Access to Medicines ([UNSG Report](#)) has the belief that,

State obligations include duties not only to respect, but to protect and fulfil the right to health... ensuring access to medicines, and particularly to essential medicines, is a fundamental element of these obligations... the imperative to respect patents on health technologies could, in certain instances, create obstacles to the public health objectives of World Trade Organization (WTO) Members.”

*UNSG Report, p7*

Its policy recommendations include;

“Governments should adopt and implement legislation that facilitates the issuance of compulsory licenses. Such legislation must be designed to effectuate quick, fair, predictable and implementable compulsory licenses for legitimate public health needs, and particularly with regards to essential medicines.”

*UNSG Report, p9*

Also,

Universities and research institutions that receive public funding must prioritize public health objectives over financial returns in their patenting and licensing practices

*UNSG Report, p9*

- Aitken, Hugh GJ. *The Continuous Wave: Technology and American Radio, 1900 - 1932*. Princeton, New Jersey: Princeton University Press, 1985.
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[https://www.whitehouse.gov/sites/default/files/docs/patent\\_report.pdf](https://www.whitehouse.gov/sites/default/files/docs/patent_report.pdf).
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<https://www.whitehouse.gov/blog/2013/06/04/taking-patent-trolls-protect-american-innovation>
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