

Patent Republics

PATENT REPUBLICS

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Abstract—This Article examines whether patent holders encourage innovation through democratic royalty sharing. This question is prompted by a developing belief among legal commentators and industry participants that private cooperation can remedy widespread transactional problems that threaten innovation. Until now, however, scholars have not examined the internal governance of patent licensing collectives. Drawing on dozens of original patent licensing contracts in force between 1856 and 2010, this Article studies the dynamic voting procedures and static rules that governed royalty apportionments. At its heart, this is an examination of the dynamism in collectives and the degree of control over pricing that members enjoy. The agreements examined in this Article reveal a surprising variety of approaches to cooperative patent pricing, including majority voting systems, expert valuations, and “rough and ready” rules. These results reveal that innovation is sometimes best encouraged by “rough and ready” rent-sharing rules that are imperfect by design rather than carefully-tuned cooperative pricing systems. This insight and others shape an urgent new view of how patent licensing collectives can foster innovation.

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INTRODUCTION

This Article examines whether patent holders encourage innovation through democratic royalty sharing. The recent influx of patent pools, research consortia, and similar groups led by companies at the vanguard of American innovation has raised a pressing and unexplored question: How does collective action influence the incentive to innovate? Through an original analysis of private agreements, this Article pulls back the curtain on patent licensing collectives to examine how the price of innovation is being set, and by whom.

Policymakers have long sought to curtail conspiracies among patent holders. By centralizing and coordinating the management of patents, licensing groups can fix prices, limit competition, and hinder innovation. This possibility came to light famously in the 1891 case of *E. Bement & Sons v. National Harrow*.¹ There, the Supreme Court considered whether a patent pool that regulated the price and use of

¹ *E. Bement & Sons v. National Harrow Co.*, 186 U.S. 70 (1902).

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an important farming tool was an unlawful monopoly. Deferring to principles of freedom of contract, the court decided the group was legal.² Ten years later, however, the court found a similar organization in violation of federal antitrust law, and in doing so established a limit on the contractual autonomy that patent holders enjoy.³ Today, the Department of Justice routinely reviews collaboration among patent holders and advises industry through business review letters and official publications that describe arrangements likely to run afoul of antitrust regulations.

Might some groups of patent holders encourage, rather than hinder, innovation? Many historical anecdotes hint at this possibility. Patent licensing groups were involved, for instance, when American airplanes shuddered into the skies over England during the first world war, when the first lonely radio broadcasts were cast into space, and when the human genome was untangled at the turn of the 21st Century.⁴ Because the internal structure of these institutions was not widely documented, however, it is unknown whether they encouraged their members to push innovation ahead, and if so, how.

This hopeful possibility has taken root in the minds of some experts amidst a widely-perceived crisis in our patent system. Today, the technologies that fuel our economy such as pharmaceuticals, software, and telecommunications are often covered by mosaics of thousands of patents held by many different owners. In this age of dispersed entitlements, “downstream” technology users are burdened with the high costs of identifying, evaluating, and negotiating licenses for multitudes of “upstream” patent rights. Moreover, patent holders who learn that their cooperation is essential to a licensee can strategically hold-out for prohibitively high royalties. Experts believe that such costs and risks hinder the use and development of technology and leave innovation to languish.

One solution to this problem is compulsory licensing—or, in the parlance of entitlements theory, a shift from “property rules” to “liability rules.”⁵ In contrast to our current patent system, in which patent holders exclude infringers vis-à-vis injunctions, a compulsory

² *Id.* at 92 (endorsing “absolute freedom in the use or sale of rights under the patent laws.”)

³ *Standard Sanitary Manufacturing Co. v. U.S.*, 226 U.S. 20 (1912).

⁴ See, e.g., Michael Mattioli, *Communities of Innovation*, 106 Nw. U. L. Rev. 103 (2012) (discussing The Manufacturers’ Aircraft Association and the SNP Consortium).

⁵ See Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv. L. Rev. 1089, 1106-07 (1972).

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licensing regime would require patents to be licensed at rates set by some organ of the state, such as a court or Congress. In a world without bargains, transaction costs and associated risks of holdouts would significantly drop.⁶ Experts believe, however, that government authorities under-compensate innovators.⁷ It appears that our patent system faces a “Morton’s Fork”: under the current regime, innovation is hampered by bargaining breakdown; under a compulsory regime, innovation would be discouraged by systematic under-compensation.⁸

In a landmark 1996 article, Robert Merges suggested that private collective action may hold the answer.⁹ Merges posited that some patent licensing collectives occupy a middle-ground between property regimes and liability regimes in which members collectively determine their own royalties.¹⁰ Like property regimes, owners would set their own prices (albeit collectively); Like liability regimes, prices would be dictated to technology users, obviating transaction costs and holdouts. In the course of presenting this theory, Merges noted the use of private voting to manage royalty-sharing in a performing rights association and, notably, in a 1917 aircraft patent pool.¹¹

This conjecture aligns with a wealth of empirical and theoretical literature on cooperation among property holders: The Nobelist Elinor Ostrom, for example, documented communities around the globe that collectively manage scarce natural resources through private voting.¹² Closer to home, law and economics scholars have observed the widespread use of voting among property holders in private condominiums and neighborhood associations.¹³ Voting among land owners is also widely used to apportion water

⁶ See, e.g., R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 15 (1960).

⁷ See, e.g., Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CALIF. L. REV. 1293, 1340–58 (1996).

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.* At the same time, by aggregating patents and securing licensing commitments from their owners, such organizations could reduce licensing transaction costs and holdout risks.

¹¹ *Id.*

¹² ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* 182–85 (1990).

¹³ Thomas W. Merrill, *Direct Voting By Property Holders*, 77 U. Chi. L. Rev. 275 (2010); Michael Heller, *Land Assembly Districts*, Harv. L. Rev., 121 Harv. L. Rev. 1465 (2008).

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rights in the arid American west. Episodes like these have fueled a standard theoretical account that property holders can, and often do, form long-enduring institutions that overcome bargaining failures by democratic means.¹⁴

The possibility that inventors sometimes cooperate in this way has not been empirically examined, and could have a sweeping impact on patent policy. Unlike the static and closed arrangements that antitrust authorities have long regulated, such “patent republics” would support ongoing exchanges involving new patents and new members. They would encourage innovation by offering prospective inventors a chance to capture royalties. If private companies possess the wisdom and the will to optimally distribute royalties to their members, then perhaps the proper focus of patent reform need not be on the government’s apportionment or valuation of patents, but rather, on designing, fostering, and monitoring private licensing collectives. As patent licensing collectives swiftly emerge within the industries that define our economy today, this question is not only of theoretical interest, but of immediate practical concern.

This Article explores the gap between theories of cooperation and the realities of collective governance.¹⁵ Fueling this study is a set of primary sources that have not been widely documented or examined: collective patent license agreements spanning the years 1856-2010. I obtained these agreements from congressional records, regional repositories of the national archives, FOIA requests directed to the Antitrust Division of the Department of Justice, the Wisconsin State Historical Society, the New York State Library in Albany, and in several instances, from patent licensing organizations themselves. In some cases, supporting documents such as corporate bylaws and congressional records were also examined. This is the first academic study of how patent holders influence the royalties they draw from licensing collectives.¹⁶

Because there is no record of every patent licensing group that has ever existed, and because many of the records that do exist

¹⁴ (various sources).

¹⁵ The methodological approach was heavily inspired by Stewart Macaulay’s landmark 1963 “gap study” of non-contractual relations in business. Stewart Macaulay, *An Empirical View of Contract*, 1985 Wisconsin L. Rev. 465 (1960).

¹⁶ Anne Layne-Farrar and Josh Lerner have provided an extremely valuable study of the static royalty-sharing formulas used by contemporary standards-based licensing groups, but their focus was not on governance. See Anne Layne-Farrar & Josh Lerner, *To join or not to join: Examining patent pool participation and rent sharing rules*, 29 International Journal of Industrial Organization 294 (March 2011).

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stem from lawsuits and congressional hearings, the potential for sampling bias is significant. Considering the paucity of empirical research on this subject however, this Article significantly advances current knowledge. (And indeed, any sampling bias that does exist may well downplay, rather than exaggerate, this Article's chief findings.) The agreements presented here document nearly two centuries of scientific and industrial progress, from 19th Century steelmaking to modern-day genetic research. These contracts describe in vivid detail the structure and internal governance of patent licensing collectives.

Four themes emerge from this analysis: First, the institutions examined exhibited a range of flexibility, from static cross-licenses limited to specific patents to dynamic communities. Second, the distribution of royalties within these groups was often determined by rough apportioning and not fine-grained valuations. Third, decisions that impacted royalties were rarely made through direct voting, but were often made by democratically appointed representatives. Fourth, many groups provided their members non-pecuniary benefits. These findings reveal a striking gap between theory and practice: Patent holders appear to prefer "rough and ready" cooperation to democratic consensus.

The discussion unfolds in three parts: Part I explains the theoretical underpinnings of the pricing problem that afflicts our patent system and the hope that cooperation can provide a solution. Part II presents the results of an original study of licensing agreements that reveals a gap between theory and practice. Part III discusses the normative results of this study and presents new findings about the role that collective action plays in our patent system. A brief conclusion follows.

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APPENDIX — (INCOMPLETE)

Table 1: Patent License Agreements Examined

| Year | Subject Matter | Source |
|-------------|---|---------------|
| 1856 | Sewing Machines | HIS |
| 1866 | Steel-Making (Bessemer Process) | LIB |
| 1877 | Steel-Making (Bessemer Process) | LIB |
| 1890 | Steel-Making (Bessemer Process) | NA |
| 1890 | Farming Tool (Harrow) | Case |
| 1895 | Pneumatic Straw Stackers | Report |
| 1899 | Sewing and Stitching Machines (Footwear) | Case |
| 1899 | Bathtubs | |
| 1900 | Seeded Raisins | NARA |
| 1903 | Automobiles | Hearings |
| 1906 | Rubber Tires | |
| 1908 | Motion Pictures | Hearings |
| 1909 | Liquid Door Checks | |
| 1910 | Soda Machines | Hearings |
| 1913 | Bicycle and Motorcycle Brakes | |
| 1916 | Beds | Case |
| 1916 | Railroad Couplers | |
| 1916 | Automobile Bumpers | |
| 1917 | Aircraft | Hearings |
| 1919 | Radio Technologies | Report |
| 1924 | Glass Containers | |
| 1924 | Flat Glass | |
| 1926 | Peach Pitting Machinery | NARA |
| 1929 | Coated Abrasives | |
| 1930 | Water Conditioning Apparatus | |
| 1930 | High-Tension Cables | |

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|------|--|----------|
| 1930 | Petroleum Refining | Hearings |
| 1931 | Rail Joint Bars | |
| 1931 | Fuel Injection | |
| 1932 | Railroad Springs | |
| 1932 | Pharmaceuticals | |
| 1932 | Textile Machines | |
| 1933 | Petroleum Refining (Gray Process) | Hearings |
| 1933 | Petroleum Refining (JUIK Group) | Hearings |
| 1933 | Hydraulic Oil Pumps | |
| 1933 | Machine Tools | |
| 1934 | Petroleum Refining (Fractional Distillation) | Hearings |
| 1934 | Lecithin Production and Refining | |
| 1934 | Variable Condensers | |
| 1934 | Color Cinematography | |
| 1934 | Dry Ice | |
| 1934 | Electric Generators | |
| 1935 | Petroleum Refining (Gas Polymerization) | Hearings |
| 1935 | Plexigum | Hearings |
| 1937 | Male Hormones | |
| 1937 | Stamped Metal Wheels | |
| 1938 | Inductive Heat Treatment | |
| 1938 | Ophthalmic Frames | |
| 1938 | Pour Depressants | |
| 1938 | Automobiles | Hearings |
| 1938 | Fuse Cutouts | |
| 1938 | Furniture Slipcovers | |
| 1943 | Air Conditioning | |
| 1948 | Tractor Cabs | |
| 1949 | Elastic Stockings | |
| 1952 | Wrinkle Finishes | |
| 1956 | Glass Fibers | |

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|------|---|------|
| 1997 | MPEG-2 Video | DOJ |
| 1997 | Wireless Data Transfer (Bluetooth) | POOL |
| 1997 | Video Transfer (OpenCable) | POOL |
| 1998 | Digital Video Discs | DOJ |
| 2001 | Mobile Phone Communications (3G) | DOJ |
| 2008 | CleanTech | |
| 2008 | Wireless Data Transfer (RFID) | DOJ |
| 2010 | Medicines (HIV) | POOL |
| 2011 | Medicines (Neglected Tropical Diseases) | POOL |

HS: State Historical Society
 NA: The National Archives (Regional Repositories)
 Case: Court decision
 RPT: Report prepared by a federal agency
 (Dept. of Commerce, FTC)
 Hearings: Congressional Hearings
 FOIA: Department of Justice
 HIS: Historians who maintained archives of agreements.
 POOL: Directly from pool.
 LIB: State Library