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Economic development depends on the establishment of appropriate institutions, such as a patent system that defends property rights in inventions. Skeptics argue that patents in early America were unenforceable because judges arbitrarily ruled against patentees. I examine 795 patent cases to assess the role of the courts and find that judges protected patent rights because they believed that inventors were motivated by expected returns. Although changes occurred in the 1850s, the courts consistently upheld the view that the patent system fostered economic growth. If inventive activity indeed responded to material incentives, this finding implies that the legal system stimulated technical change by reinforcing the effectiveness of the patent system.

> *The laws of the United States are extremely favorable to the division of property.*
>
> —Alexis de Tocqueville, *Democracy in America*

A central problem for newly industrializing societies is to understand the institutions that foster economic and technological development, such as property rights systems. A close examination of the characteristics of a specific institution such as the early American patent system might provide valuable insights into the institutional problems confronted by start-up economies. Some economists have argued that technical change responds to private expected returns and is retarded by weak property rights. Thus, Douglass North and Robert Thomas viewed the formal recognition of patents in the English Statute of Monopolies as a prerequisite for the industrial revolution.[1] Although the makers of the American system deliberately distinguished it from the English legal and patent systems, they adopted a similar assumption that economic growth would be encouraged by the defense of property rights in inventions. The framers of the Constitution of the new Republic

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The author is Visiting Assistant Professor of Economics, University of California, Los Angeles, CA 90024.

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[1] North, *Structure and Change*, pp. 164–65; and North and Thomas, *Rise*. For a general discussion of property rights, see Demsetz, "Theory." Engerman and Sokoloff, "Factor Endowments," link the operation of the U.S. patent system to the broad-based participation in economic and inventive activity that characterized U.S. economic growth in the nineteenth century.

unanimously gave Congress the mandate "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive right to their respective Writings and Discoveries."[2] Chief Justice John Marshall pointed out that the patent grant "is the reward stipulated for the exertions of the individual, and is intended as a stimulus for those exertions."[3] Significantly, Japan later designed its patent system as a conscious attempt to emulate the American path of development that emphasized the enforcement of property rights vested in patents.[4]

Some scholars have, however, questioned whether patent systems were effective in increasing the rate of technical change or in achieving sustained growth in countries like Britain and the United States. For a number of reasons, these researchers doubt whether inventive activity is indeed induced by the prospect of material gain or market forces in general, especially during the early stages of industrialization. First of all, they argue that some inventions were not patentable, and those that were patented tended to be unimportant or "microinventions." Second, property rights in inventions are thought to have been unenforceable because technology at this time was fairly simple and readily duplicable and infringement was difficult to detect. Others contend that such rights were of little value because the early legal system was "antipatent," and judges routinely overturned patent cases, especially those involving important inventions.[5] Popular histories cite the experiences of Eli Whitney, Oliver Evans, and early steamboat inventors in support of this view.[6] If patentees could not enforce their rights, it might be expected

[2] Sec. 1, Article 8 (clause 8) of the Constitution authorized the congressional patent statutes of 1790, 1793, 1800, 1836, and 1839 that governed the courts until the Civil War period. Note that the phrasing of the patent clause implies that inventors had a natural right in their creations, which the Constitution formally intended "to secure."

[3] *Grant v. Raymond*, 31 U.S. 218 (1832).

[4] Japan instituted its patent system in 1899, after a special commission visited the U.S. Patent Office. The Japanese envoy stated: "we have looked about us to see what nations are the greatest, so that we could be like them; . . . and we said, 'What is it that makes the United States such a great nation? and we investigated and we found it was patents, and we will have patents.'" Cited in Ladd, "Patents," pp. 751–66.

[5] See also Joel Mokyr, *Lever*; and Christine MacLeod, *Inventing*.

[6] The claim that these "great inventors" were unable to enforce their patents because the system was unjust is disputable. According to Bishop, *American Manufactures*, Whitney had attempted to extend his monopoly of the patented invention to the output market for cotton: "The unfortunate arrangement of Whitney and Miller, toward the close of the year, to erect gins throughout the cotton district, and engross the business of ginning for a toll of one third, instead of selling the machines and patent rights, stimulated the spirit of infringement" (p. 49). Oliver Evans's patent—extended by Congress for a full term of 32 years—claimed that he had invented the grist mill, although his invention was merely for an *improvement* of already existing automated grist mills. Similarly, steamboat patents failed to distinguish between the state of the art and the inventor's contribution. Both Whitney and Evans, contrary to anecdotal evidence, prospered from their business deals. Charles Goodyear is frequently depicted today as an example of a poverty-stricken inventor, yet according to contemporary observers: "There has never been a more illustrious exhibition of the beneficient operation of the patent laws than in the case of Charles

that inventors would opt for alternative methods of protection, such as secrecy or the use of strategies based on lead-time and the learning curve. Under such circumstances, an index of patented inventions would be of little relevance to charting and understanding the progress of technology, because the value of a patent right to the inventor is determined partly by the value of the invention and partly by the "legal tender" vested in the patent grant. Thus, the market value of patented inventions depended on the attitudes of the judiciary, as well as on the ability of the legal system to defend the right of patentees to use—and exclude others from using—their property.

The efficacy of the patent system depends on the assumption that inventions are induced by the prospect of earning rents. Recent results from a sample of 160 "great inventors" indicate that the majority of technologically important nineteenth-century American inventions were protected by patents. Inventors were clearly interested in extracting returns from their inventions, and few chose to bypass the patent system. Moreover, patenting by both ordinary and so-called "great inventors" was indeed responsive to material incentives. The patent system in the United States induced a broad cross section of the population to make investments in inventive activity as market expansion increased the potential returns to invention.[7] Ancillary evidence such as the assignment of patent rights also suggests that early patentees were able to enforce property rights and to appropriate gains from their inventions. At the same time, manufacturing productivity at the firm level appears to have varied directly with the degree of patenting.[8] Thus, it seems plausible that the early American patent system was indeed effective in granting rights that enhanced private returns to inventors and encouraged the development and diffusion of new technologies.

Little systematic evidence has been collated to investigate the enforceability of property rights in patents during the early years of the

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Goodyear's invention, . . . the result of the splendid reward which these laws offered as the crown of his success. For twenty-two years the inventor and his assignees have enjoyed a monopoly of the invention, and a number of magnificent fortunes have been acquired from this monopoly" (*Scientific American*, Mar. 18, 1865, p. 183). Whatever the merits of these examples, although individual histories yield interesting and useful insights, a few exceptions—however notorious—provide insufficient evidence to prove or disprove a theory: "It is a popular error to suppose that much knowledge, painful effort, constant disappointment, and many wearisome failures are the necessary preliminaries to an inventor's success. True, there are individual examples of this kind; they are exceptions," Munn & Co., *The United States Patent Law*, p. 3. See Khan and Sokoloff, "Schemes," for a more extensive study of 160 great inventors, the majority of whose patents were enforceable.

[7] For general patterns of inventive activity, see Schmookler, *Invention*; and Sokoloff, "Inventive Activity." Khan and Sokoloff, "Schemes" and "Entrepreneurship," examine the record of important inventions. For the thesis that the United States was characterized by a larger segment of the population increasing their investments in inventive activity as markets expanded, see Sokoloff and Khan, "Democratization."

[8] Sokoloff, "Invention."

patent system, in part because it is an inherently difficult subject to analyze. Patent litigation records do, however, provide insight into the effectiveness of the patent system, even though generally only a small proportion of all disputes ever reached the courts. The present article examines all 795 patent cases reported from 1790 through 1860 in order to assess the legal doctrine and standards that prevailed at the inception of the U.S. patent system and the strength of property rights in patents.[9] The evidence suggests that during this critical period of U.S. development, the courts recognized the value of individual property in ideas and helped to create a patenting process that was sustained by the belief that property rights in inventions would be protected by legal consistency and certainty. Consequently, one of the major concerns of the U.S. legal system was to identify and enforce the rights of the first and true inventor, rather than to protect public welfare by deterring private monopolies, an orientation that led to rent-seeking behavior among innovative industries. It was only towards the middle of the century that the judiciary consciously attempted to address the problem created by the monopoly aspect of the patent grant, a concern which had always been the focus of English law.[10]

In the first section of the article, I present a general discussion of patenting and the legal system. In the second part I consider previous studies that relied on data showing the win-loss ratio in patent cases to support the argument that early patent rights were unenforceable because judges were antipatent. I point out that models of law and economics indicate that quantitative evidence about the proportion of favorable plaintiff decisions cannot be used to make inferences about the attitudes of the courts; however, such data may be informative about other aspects of the judicial system that yield insights into the nature of patent property during the period. In the final section I present a multivariate probability model that indicates that decisions in patent cases were consistent across the nation. The results do not support the hypothesis that the legal system was prejudiced against important inventions and favored gadgets or "marginal inventions," though they do suggest that the probability of a favorable outcome for the patentee was higher in common law courts (where the patentee's property rights were at issue) than in the Supreme Court or courts of equity (where individual monopoly rights were weighed against social welfare).

[9] The data sources are discussed in the Appendix. For an overview of the courts until 1800, see Henderson, *Courts*. A comprehensive analysis of the colonial patenting process is available in Bugbee, *Genesis*. Burchfiel, "Pseudohistory," supports many of the conclusions of this study. For additional sources on early legal reporting, see Surrency, "Law Reports"; and Young, "Law Reporting."

[10] A more general implication of the results of this study is that the legally sanctioned correspondence between patenting and inventive activity supports the claims of researchers who employ patent data to study technological change over this period, rather than those who are skeptical of the utility of patents as an index of invention.

PATENTING AND THE UNITED STATES LEGAL SYSTEM

We obtain patents for protection, not for ornament.
—Dubois and Dubois, *Inventive Age* editors (1892)

Patent laws are instituted by congressional statute and litigated in the U.S. federal courts. Jurisdiction for patent law and litigation was entrusted to the federal courts because of the prevalent desire to foster interstate commerce in the early Republic. It is significant that the debate about patent rights was deliberately conducted at the national and not the state level.[11] Consistent regional decisions would serve to increase the value of holding a patent; first, by expanding the coverage of the patent to a much wider market; and second, by eliminating the uncertainty and costs of enforcement if litigation were governed by the laws of individual states.

Patents were initially granted by a tribunal comprising the Secretaries of State and War and the Attorney General and were signed by the President of the United States.[12] After 1793 inventors could obtain a patent simply by paying a one-time filing fee, with contested claims settled through litigation. Inventors were responsible for determining the prior state of the art before filing for a patent. By the 1830s the Ruggles Senate Committee claimed in a much cited report that the registration system was untenable because "Out of this interference and collision of patents and privileges, a great number of lawsuits arise, which are daily increasing in an alarming degree, onerous to the courts, ruinous to the parties, and injurious to society."[13]

As a result, the patent laws were revised in 1836 to incorporate features that form the basis for the present patent system. The previous registration system in which patents were automatically granted on

[11] The Supreme Court noted in *Allen v. Blunt et al.*, 1 F. Cas. 450 (1846): "One of these ends undoubtedly is, uniformity in the construction of our great system of Patent Laws throughout the U.S. . . . Questions connected with the Patent Laws themselves, when decided, govern numerous other cases and much larger amounts than are disclosed in any one verdict." The division of functions of federal and state courts was discussed in the 1812 case, *Livingston v. van Ingen*, 15 F. Cas. 697, New York, where it was ruled that under federal law the right to exclude related to intangible property, whereas the states' function was to supervise tangible property such as the product of the patent, and to protect its residents against fraudulent patent claims and licenses. (A license does not partake of the patent right; it is merely a permit to use the invention.) The extent of state jurisdiction is examined in Weisberger, "State Control." At the federal level, after 1819, "the jurisdiction of the circuit courts embrace all cases, both at law and in equity, arising under the patent laws . . . without regard to the citizenship of the parties or the amount in controversy," *Day v. Newark Rubber Co.*, 1 Blatch. 628 (1850).

[12] Prior to 1793, the tribunal consisted of Thomas Jefferson (Secretary of State), Henry Knox (the Secretary of War), and Edmund Randolph (the Attorney General), who personally examined each patent application. Jefferson, realizing the need to foster domestic inventiveness, decided to cede the examination function to the more decentralized federal courts.

[13] Although the comments of the promoters of the 1836 Act are widely cited by scholars today, the polemical nature of any lobby should be taken into account. John Ruggles obtained the first patent granted under the new system, for a locomotive steam-engine.

TABLE 1
LITIGATION OF PATENTED INVENTIONS, 1800–1860

Decade	Patent Cases	Number of Patents Litigated	Total Patents	Cases as Percentage of All Patents
1800–1809	6	6	911	0.6
1810–1819	37	20	1,998	1.8
1820–1829	36	27	2,697	1.3
1830–1839	37	14	5,077	0.7
1840–1849	198	95	5,516	3.6
1850–1859	415	171	19,661	2.1
1860	64	18	4,363	1.5

Notes: Statistics for the percent of patents litigated are not reported, because in 115 cases no information was available about the patent at issue. The final column shows the number of patent cases within a decade as a percentage of all patents filed within that decade. These figures include common law and Supreme Court cases, equity cases, interferences, and appellate cases from decisions by the Commissioner of Patents. Interference and appellate cases from the Commissioner of Patents were introduced with the reforms of the patent system in 1836.
Sources: See the Appendix.

payment of a $30 fee was replaced by the current examination procedure. In the new regime, employees of the Patent Office—technically qualified examiners—scrutinized each application and granted only those that conformed to the patent laws. If two or more applications claimed the same discovery, the Commissioner of Patents was authorized to initiate interference procedures to decide the priority of the invention in question. Inventors could make formal appeals to the Chief Justice in the District of Columbia in response either to patent application or interference decisions by the Commissioner of Patents.

Despite the rhetoric of the Ruggles Committee, the proportion of total patents litigated before the federal courts was not high. In the early years of the Republic, the federal courts were in general little used, except for admiralty and maritime cases. Litigants in civil suits had the right to a trial by jury once the value at issue exceeded $20, but in the first decade the courts dealt with an annual average of only 380 suits for the entire nation. The earliest patent case on record was for the district of New York, when a patent granted to Benjamin Folger for the production of candles was repealed in August 1792. This setback, however, did not deter Folger from subsequently seeking and obtaining a patent for pumps in 1804. Folger's example is typical of the practice in later years, when unsuccessful litigants still proceeded to file further patents.

From 1790 to 1860 a total of 795 patent cases were reported or cited in judicial decisions.[14] As indicated in both Tables 1 and 3, the overall propensity to litigate (gauged by cases relative to patents) decreased over time, from the first major surge in patenting late in the first decade

[14] See the Appendix for details.

of the nineteenth century, through the Act of 1836.[15] The extremely low average propensity to litigate evident in all regions during the 1830s appears anomalous given the alleged dissatisfaction with the patent system. The litigation rate prior to the 1836 change may, however, have resulted from the high degree of uniformity and certainty that actually characterized the judicial appeals process.[16] The structural change in 1836 was associated with a jump in litigation, perhaps because of uncertainty about the new system. Subsequent policies proved relatively consistent and predictable, however, leading to the decline in later decades.[17] The marked increase in the number of plaintiffs seeking injunctions before courts of equity also appears to have been a factor.[18]

[15] The U.S. figures are superficially similar to the pattern for England:

LITIGATION OF PATENTED INVENTIONS IN BRITAIN, 1800–1849

Decade	Patent Cases	Patents Litigated	Total Patents	Cases as Percent of Total Patents
1800–1829	61	50	3,510	1.4
1830–1839	47	38	2,453	1.6
1840–1849	128	104	4,581	2.3

Source: These figures are from Bennett Woodcroft, *Reference Index* (1855), as cited in Dutton, *Patent System*, p. 71.

In both countries there is a jump in the number of lawsuits in the 1840s, but the United States exhibits a greater tendency for multiple suits to be filed for a single patent, implying that a particular patent in Britain had a higher probability of being litigated. However, these overall similarities conceal marked differences in the attitudes of the courts and in the ability of patentees to enforce their rights. British cases were decided on an ad hoc basis, by means of "judge-made law," leading to uncertainty for both plaintiffs and defendants. MacLeod, *Inventing*, argues that the eighteenth-century English patent system was ineffectual, for the "odds were stacked against patentees," because the process of litigation was costly, and the courts inconsistent and "notoriously full of pitfalls for patentees." See Dutton, *Patent System*, for a discussion of patent litigation in early nineteenth-century Britain. It should also be noted that, until reforms of 1852, the cost of patent grants in Britain ranged from £100 to £400; hence, English patents represented inventions of higher average value than those in the United States.

[16] The point is not that the law was immutable and always consistent. Rather, the right of appeal and the rule of precedent ensured that dubious decisions would be filtered out to attain a consistent equilibrium. For instance, Philos Blake's patent for bed-casters was upheld in Connecticut, but overturned by a New York jury. The judge ordered a new trial in New York in order to obtain uniform decisions in both regions, *Blake v. Sperry*, 2 N.Y. Leg. Obs. 251 (1843). Secondly, although the law changed, the Constitutional belief in the "sacred rights of genius and property" was unchanged, as all participants recognized: "Such has been the uniform construction of the law in the circuit courts, that a patent can be declared void for no other defect in the specification than fraudulent concealment or addition," *Whitney v. Emmett*, 29 F. Cas. 1074 (1831). See also *Gray v. James*, 1 Robb 120, 140 (1817); *Reutgen v. Kanowrs*, 1 Wash. 168; *Park v. Little*, 18 F. Cas. 1107 (1813); *Lowell v. Lewis* 15 F. Cas. 1018 (1817); *Whittemore v. Cutter*, 29 F. Cas. 1120 (1813); *Evans v. Eaton 7 Wheat*, [20 U.S.] 429, 430. Unquestionably, judges did vary at times in their interpretation of the statutes, especially at the district level. However, circuit decisions were the responsibility of Supreme Court Justices, who lived in residence together while the Supreme Court was in session. This network of close communication was evident in frequent citations to decisions from other circuits, and contributed to the formulation of a coherent national policy towards patents and patenting.

[17] For a formal model, see Priest, "Measuring."

[18] I consider the significance of equity courts later in the article. The 1789 Judiciary Act

Some scholars have contended that the probability that the courts would uphold a patent right increased in the 1830s because judges recanted on their former legalistic doctrines. I consider this argument later in greater detail, but it might be noted here that this contention ignores the effects of the drastic revision of the patent system in 1836, which devolved some of the functions of the courts to the Patent Office. Previously, the burden of prosecuting infringement claims and interferences had been on the patentee and the courts; after 1836 the Commissioner of Patents handled many of these cases. Plaintiffs in interference cases before the Commissioner of Patents faced a 65 percent rejection rate; the Patent Office thus filtered out potential patent disputes that previously would have appeared before the courts. In short, the composition of patent cases had changed—it is therefore hardly surprising that the proportion of unfavorable decisions in the courts fell after 1836.

If general enforceability and weak property rights were at issue, one might expect the sectoral distributions of patents and cases to vary together. Yet we observe in Table 2 a predominance of patent cases in the manufacturing sector, especially in the more commercialized or industrialized regions of New York, southern New England, and in the Northeast overall. Even in the Midwest, litigation was highest in manufacturing (43 percent), followed by construction (31 percent), although agriculture dominated both local patenting and economic activity. The proportion of manufacturing litigation is just as pronounced when we consider the distribution of contested patents (as opposed to patent cases, where one patent might be the subject of multiple lawsuits): almost one half of all disputed patents related to manufacturing.[19] Patent disputes, patenting, and manufacturing are so integrally related that it is difficult to disentangle fully the reasons behind the number of litigated patents and cases. Mean awards to plaintiffs in agriculture ($7,360) were at least three times as high as those in manufacturing ($2,463), implying that higher average commercial value was not the full explanation.[20] It is possible that the potential for

established courts of equity at the same time as the common law courts. However, patent litigants made little use of equity courts before the 1840s. In the 1840–1844 period, 24.1 percent of all patent disputes were in equity. Figures for succeeding periods were: 1845–1849, 42.1 percent; 1850–1854, 30.1 percent; and 1855–1860, 21.4 percent. The increase in equity litigation was possibly due to heightened industrial competitiveness.

[19] Litigation in manufacturing patents was the least affected by changes in the patent system in 1836, as shown by the jump in its share of patent cases, from 40 percent in the 1820s to 78.6 percent in the 1830s.

[20] As I have noted, in several cases "it [was] the object of the parties to have these questions decided, and their respective rights ascertained, without regard to the matter of damages," *Day v. Candee*, 7 F. Cas. 230 (1853). Damages were decided by the jury, which was instructed to consider foregone profits, including interest sacrificed, which the judge could treble at his discretion, with costs. In *Whitney v. Emmett*, 29 F. Cas. 1074 (1831), the plaintiffs "contended that, as an item in the estimation of actual damages, the jury may examine and determine the loss sustained by the

TABLE 2
PERCENTAGE DISTRIBUTION OF PATENTS AND CASES BY REGION AND SECTOR, 1790–1860
(row percentages)

	Agriculture	Building	Manufacturing	Transportation	Other	Total
Northern New England						
Cases	20.0	20.0	50.0	10.0	0.0	1.7
Patents	27.3	21.3	38.8	7.8	4.9	7.7
Southern New England						
Cases	13.0	17.6	55.6	6.5	7.4	18.5
Patents	13.2	16.4	53.4	9.5	7.5	21.0
New York						
Cases	10.8	22.8	45.6	15.2	5.7	27.0
Patents	22.9	17.9	38.1	13.4	7.8	31.7
Pennsylvania						
Cases	11.1	16.7	33.3	22.2	16.7	12.3
Patents	19.0	14.4	41.6	14.9	10.1	13.6
Southern Mid-Atlantic						
Cases	11.8	17.6	58.8	11.8	0.0	2.9
Patents	24.9	2.3	35.1	18.3	9.3	7.4
Midwest						
Cases	13.1	31.2	42.6	11.5	1.6	10.4
Patents	33.3	16.3	31.6	12.5	6.3	6.4
District of Columbia						
Cases	15.9	19.6	38.4	15.9	10.1	23.6
Patents	12.5	25.0	34.0	21.9	6.0	1.4
Other						
Cases	28.6	28.6	19.1	9.5	14.3	3.6
Patents	34.8	15.8	27.4	11.8	7.0	9.8
Total Cases	79	124	254	81	47	585
Percent	13.5	21.2	43.4	13.9	8.0	100
Total Patents	1,009	753	812	580	361	4,515
Percent	22.4	16.7	40.1	12.9	8.0	100

Notes: The table excludes *ex parte* appeals from the Commissioner of Patents. The District of Columbia data are not representative of local litigation because all interference cases were tried in that region; cases before the Supreme Court are also included in DC litigation. Litigation in the building sector is inflated by an outlier: one patent accounts for 78 cases in this sector. If that patent is removed, manufacturing litigation by region amounts to 50, 63, 53, 38, 62, 55, 41, 27 percent, respectively, with a 49 percent share of litigation overall. Patent data are from a random sample of 4,515 patents categorized by sector of final use. For details about the patent sample, see Sokoloff, "Inventive Activity." The litigation data cover the years 1790 to 1860, whereas the patent data are for the period from 1790 to 1846.
Sources: See the Appendix.

reduction of the price of the articles manufactured by the patented machine, in consequence of the competition brought into the market against them, when the patentee had a right to a monopoly; and going yet further, they say, that the injury done to the reputation of the manufacture, by the inferior skill and workmanship of the offender, may be fairly and legally brought into the calculation of actual damages." Justice Story advised the jury in *Lowell v. Lewis*, 15 F. Cas. 1018 (1817), "Let the damages be estimated as high as they can be . . . if the plaintiff's patent has been violated; that wrongdoers may not reap the fruits of the labor and genius of other men." Only one in ten cases reports the damages awarded, ranging from 3 cents (*Kneass v. Schuylkill Bank*, 14 F. Cas. 746

conflict increased with market exchange and that manufacturing patent rights were more likely to be sold or licensed. Firms in the manufacturing sector were in more direct competition, and thus may have evinced a lower tolerance for infringement and a higher propensity to litigate. For instance, 50 percent of all interference cases (which involve patent applications that include similar claims) related to manufacturing inventions. The interference records suggest a higher likelihood of conflict because inventors of manufacturing patents were directing their attentions to similar problems, as well as attempting to invent around existing patents.[21] As such, many patent conflicts brought before the courts might have been associated with business strategies rather than questionable property rights.

Because legal jurisdiction was limited to the circuit where an alleged violation of the patent right occurred, litigation patterns also reflect the use of inventions. Table 3 indicates that the proportion of lawsuits relative to the number of patents awarded was lowest in less-developed regions such as northern New England and the southern Mid-Atlantic states. Because patents were often litigated in regions other than where the invention took place, these percentages may provide information of only limited use. Nonetheless, both patenting and conflicts about patent rights were clearly disproportionately concentrated relative to population in the emergent industrial markets of New York and Massachusetts, as well as those of Pennsylvania and Ohio. When regional markets such as the Midwest expanded, patenting and litigation also increased: after the 1830s the Midwest accounted for a rapidly growing share of patent cases, totalling 11 percent of antebellum litigation. These patterns suggest a growing concern about property rights and the extraction of returns to inventions as markets developed.

Table 4 provides further evidence of a relationship between markets and litigation. The rows of the table show the residence of the inventor of the primary patent at issue in the lawsuit, whereas the columns show the location of the alleged violation of the patentee's right. Over the period up to 1860 Massachusetts accounted for 15 percent of total patents granted, and New York patents amounted to 30 percent of all patents. Clearly, these two areas were the focus of a higher propensity to litigate; more than two-thirds of all 387 lawsuits involved patents filed in Massachusetts and New York (20.7 percent and 47.8 percent respec-

[1820]), to $23,220 with costs (*Parkhurst v. Kinsman*, 18 F. Cas. 1,203, 1,206 [1848]). Costs typically amounted to around $300, but some cases involved expenses as high as $20,000 (*Seymour v. McCormick*, 57 U.S. 480 ([1850])).

[21] "A presentation of the industries which are based upon patented inventions—either inventions which have created new industries or inventions which have revolutionized old industries—would include almost all of the manufacturing industries of the present day" (reported in Ladd, "Patents"). Bishop, *American Manufactures*, makes it clear that businesses of the day tended to seek patent protection, rather than relying on secrecy.

TABLE 3
THE REGIONAL PROPENSITY TO LITIGATE: CASES, PATENTS, AND LITIGATION RATES IN THE UNITED STATES, 1790–1860

REGION	1790–1799	1800–1829	1830–1839	1840–1849	1850–1859	1860
Northern New England						
Cases	0	4	6	6	9	0
Patents	15	465	589	281	932	238
Percent	0.0	0.8	1.0	2.1	1.0	0.0
Southern New England						
Cases	0	20	9	49	47	7
Patents	71	1,408	1,152	1,096	4,219	786
Percent	0.0	1.4	0.8	4.5	1.1	0.9
Southern Mid-Atlantic						
Cases	0	3	1	2	10	2
Patents	28	445	392	419	1,113	204
Percent	0.0	0.4	0.3	0.5	0.9	1.0
New York						
Cases	1	13	7	47	117	6
Patents	39	1,680	1,594	1,759	5,791	1,278
Percent	2.6	0.8	0.4	2.7	2.0	0.5
Pennsylvania						
Cases	4	23	4	27	31	2
Patents	67	752	709	776	2,499	513
Percent	6.0	3.1	0.6	3.5	1.2	0.4
Midwest						
Cases	0	0	6	29	45	6
Patents	0	167	324	630	3,026	730
Percent	0.0	0.0	1.8	4.6	1.5	0.8
Other						
Cases	2	2	0	5	4	1
Patents	27	534	574	531	2,456	614
Percent	7.4	0.4	0.0	0.9	0.2	0.2
U.S. Total						
Cases[a]	8	79	37	198	415	64
Patents	247	5,451	5,077	5,516	19,661	4,363
Percent[a]	3.2	1.4	0.7	3.6	2.1	1.5

[a] The U.S. total includes cases in the District of Columbia, which is atypical because all appeals from the Commissioner of Patents and interferences are filed in the District. If the DC cases are excluded, the final three percentages fall to 3.2 percent (1840–1849), 1.5 percent (1850–1859), and 0.6 percent (1860). The Midwest category consists overwhelmingly of cases for the district of Ohio. The regional shares of patent cases over the entire period are as follows: Northern New England, 3.1 percent; Southern New England, 16.5 percent; New York, 23.8 percent; Pennsylvania, 11.4 percent; Southern Mid-Atlantic, 2.2 percent; Midwest, 10.7 percent; and Other (including the District of Columbia), 33.5 percent.

Notes: The totals for regional patents are from the United States Patent Office, *Annual Report for 1891*.
Sources: See the Appendix.

tively). New York patentees were involved in legal disputes about their inventions across the country, and the column percentages for the District of Columbia (representing appellate cases) indicate that inventors located in New York were also more likely to appeal decisions. Although these figures raise a number of questions about the underlying causal mechanisms, the data do seem to confirm that litigation was more

TABLE 4
THE LOCATION OF PATENTEES RELATIVE TO LITIGATION OF THEIR PATENTS, 1800–1860

LOCATION OF PATENTEE	LOCATION OF PATENT LITIGATION						
	District of Columbia	Massachusetts	Other New England	New York	Pennsylvania	Southern Mid-Atlantic	Total
District of Columbia							
Number	1	1	2	0	0	0	4
Row %	25.0	25.0	50.0	0.0	0.0	0.0	100
Column %	1.4	1.1	8.0	0.0	0.0	0.0	1.0
Massachusetts							
Number	4	54	10	6	6	0	80
Row %	5.0	68.0	12.5	7.5	7.5	0.0	100
Column %	5.4	59.4	40.0	4.8	10.7	0.0	20.7
Other New England							
Number	7	4	7	16	0	0	34
Row %	20.6	11.8	20.6	47.1	0.0	0.0	100
Column %	9.5	4.4	28.0	12.8	0.0	0.0	8.8
New York							
Number	40	25	4	85	19	12	185
Row %	21.6	13.5	2.2	46.0	10.3	6.5	100
Column %	54.1	27.5	16.0	68.0	33.9	75.0	47.8
Pennsylvania							
Number	12	4	1	8	18	1	44
Row %	27.3	9.1	2.3	18.2	40.9	2.3	100
Column %	16.2	4.4	4.0	6.4	32.1	6.3	11.4
Southern Mid-Atlantic							
Number	10	3	1	10	13	3	40
Row %	25.0	7.5	2.5	25.0	32.5	7.5	100
Column %	13.5	3.3	4.0	8.0	23.2	18.8	10.3
Total							
Number	74	91	25	125	56	16	387
Row %	19.0	23.5	6.5	32.3	14.5	4.1	100
Column %	100	100	100	100	100	100	100

Notes and Sources: The column for the District of Columbia represents appellate cases. The Southern Mid-Atlantic region includes New Jersey, Delaware, and Maryland. The total represents all cases for which information about the inventor and his residence is currently available. The data were obtained by matching Meyer's index of lawsuits in *Federal Decisions* with entries in the United States Patent Office, *Annual Report* of the Commissioner of Patents for various years, and comprises part of a larger study in which I assess technical diffusion over the period.

related to markets and competition than to problems in enforcement. *Sickels v. Rodman*, 22 F. Cas. 26 (1843) illustrates the use of litigation as a competitive strategy. Frederick Sickels, a "talented and very ingenious young mechanic" from New York, invented a cut-off valve for steam engines that resulted in large cost savings. Within a few months of obtaining a patent in May, 1842, he successfully prosecuted a manufacturer of steam engines "to establish the originality and validity of his patent," and so send a signal to deter potential infringers.

It should also be noted that multiple litigation was characteristic of the American legal system, with 76 patents accounting for some 585 cases. More than a third of those cases involved a small number of patents that had been extended by Congress beyond the usual term of 14 years, such as William Woodworth's planing machine, and the Blanchard lathe patent. Extended or renewed patents inevitably generated a great deal of controversy, pitting assignees and licensees, and other members of the public, against the patentee. Members of the Supreme Court themselves were divided about the division of rights between patentees and owners of machines protected by patents that would normally have expired after 14 years but had been extended for a total of as much as 42 years (*Wilson v. Rousseau*, 45 U.S. 646 [1846]). Thus, a significant fraction of patent disputes related to a few atypical inventions, rather than to the issue of the general enforcement of patent rights.

In short, the first half of the nineteenth century was a critical period characterized by competition and expanding markets, a growing manufacturing sector, and a sharp increase in invention and innovation. Fewer than 1,000 patents were issued in the first decade of the nineteenth century, whereas almost 20,000 were granted in the 1850s. The patent system itself changed from a registration to an examination system. The observed patterns of litigated cases inevitably reflected, and were a function of, these systematic changes, rather than being indicative of weak enforcement of property rights in patents. In contrast to this view, some researchers designate 1794 to 1831 as the "Embarrassing Era," arguing that judges were "antipatent" and invalidated patents because of trivial technicalities or arbitrary decisions. The next section therefore examines the claim that patent litigation indicated that the judiciary was hostile to patent property.

THE ATTITUDES OF THE COURTS TOWARDS PATENT RIGHTS

> *In this country the exclusive right of the inventor to property in patents . . . has always been recognized, and the courts adjudicating patents have generally construed patents liberally on the principle in equity that "property rights may prevail rather than perish."*
>
> —Arthur H. Giles, *The Benignant Agency of Construction in the Courts (1915)*

TABLE 5
REPORTED DECISIONS IN PATENT CASES, 1800–1860

Decade	Decisions For Patentee	(%)	Decisions Against Patentee	(%)	ND
Decisions Including Appellate Cases from the Commissioner of Patents, 1800–1860					
1800–1809	3	50	3	50	—
1810–1819	11	39	15	54	2
1820–1829	8	25	24	75	—
1830–1839	7	54	5	39	1
1840–1849	95	56	65	39	9
1850–1859	146	51	131	46	10
1860	25	56	20	44	—
Total	295	51	263	45	22
Decisions Excluding Appellate Cases from the Commissioner of Patents, 1840–1860					
1840–1849	94	61	52	34	8
1850–1859	113	53	93	44	8
1860	11	58	8	42	—
Total (1800–1860)	247	53	200	43	19

Notes: The patentee of the invention at issue was the defendant in 25 of these cases. The data refer to decisions where the patentee won the lawsuit (for); or lost the case (against). ND represents cases where no decision was reached either for or against the patentee, such as in the event of a mistrial, or where the case was remanded to another court for a lack of jurisdiction. Appeals from the Commissioner of Patents were introduced with the patent system reforms of 1836.
Sources: See the Appendix.

Those who question the attitudes of the courts towards patentees have tended to base their conclusions on the proportion of outcomes decided in favor of the plaintiff.[22] According to this criterion, the judiciary was "antipatent" prior to 1836, implying that inventors were unable to enforce their rights and that patents amounted to little more than documents. The number of verdicts for the plaintiff increased after this period, hence the inference is made that judicial attitudes shifted toward support of patent rights. A superficial examination of the available records appears to support the contention that the proliferation of patent grants and changing judicial attitudes adversely affected patent values in the early period. Table 5, for instance, indicates that 75 percent of the verdicts for the 1820s were decided against the patentee, whereas the outcomes for the second half of the period seem to be more "fair." Because the 1793 act left the validation of patents to the courts,

[22] See Prager, "Trends," "Changing Views," and "Influence." Lubar, "Transformation," asserts that "In the first three decades of the nineteenth century, Congress was not favorably disposed to patentees, and courts dismissed many patent-enforcement cases on narrow technical grounds." Newmeyr, *Supreme Court Justice Story*, also supports this view. Both Lubar and Newmeyr cite Prager's work as evidence for their arguments. This alleged inconsistency in the attitudes of the courts is taken to imply that patent statistics are invalid indices of inventive activity. For instance, Sanders hypothesizes that changing attitudes of the court affected the proportion of inventive activity measured by patent statistics (Sanders, "Measuring").

previous researchers concluded that the decisions reflected arbitrary judge-made law. This, however, was decidedly not the case.

The use of data on decisions in patent cases to make inferences about the attitudes of the courts implicitly assumes that cases before the courts were representative of the underlying distribution of all patent disputes.[23] If all disputes were litigated, or if litigated cases were selected randomly, then we could be certain that a change in the patentee recovery rate (from 37 percent prior to 1836 to 55 percent for the remainder of period under study) reflected a change in judicial attitudes. However, litigated cases (those that actually reach the courts) are not drawn randomly from the population of disputes. Given this problem of selection bias, the rate of plaintiff victories cannot be used to gauge judicial attitudes nor changes in those attitudes. Reported cases are more useful for informing qualitative judgments; quantitative analyses of litigated cases must be approached with full realization that only limited inferences may be drawn about the general population of all disputes.[24]

The frequency with which later courts cited decisions from the previous period provides another perspective on the issue of whether early decisions were arbitrary. If early decisions were indeed idiosyncratic and prejudiced against patentees, one might expect that subsequent—allegedly more liberal—courts would reject the former legal standard. But as Figure 1 shows, pre-1831 cases have been cited as frequently as later decisions.[25] Indeed, decisions for early suits are still cited in legal decisions today, suggesting that these cases provided a lasting foundation for policy toward patent disputes. As I have noted, patent law was conducted at the federal level, and decisions in the United States were ultimately governed by a Constitution that recognized a natural right in inventive property. Extensive reading of patent cases indicates that American courts from their inception attempted to establish a store of doctrine that fulfilled the intent of the Constitution: "[The statutes] should receive a liberal construction, to effectuate the intention of the legislature" (*Whittemore v. Cutter*, 29 F. Cas. 1120 [1813]).[26]

[23] For more detailed models of litigation, see Priest and Klein, "Selection"; and Priest, "Characteristics." Priest, "Common Law," suggests that, in the limit, the judiciary is effective only in forming patentees' expectations by adhering to predictable policies.

[24] Priest, "Measuring."

[25] An argument for structural change in the legal system would more plausibly apply to the 1851 case, *Hotchkiss v. Greenwood*, 52 U.S. 248 (1851), which altered the standard of patentability and required patents to fulfill a technical standard of "nonobviousness." However, a time series of citations shows that the Hotchkiss decision was not implemented in the courts until after the Civil War. See also Burchfield, "Pseudohistory."

[26] Thus, as Justice Story pointed out in *Ames v. Howard*, 1 F. Cas. 755 (1833): "It has always been the course of the American courts to construe these patents fairly and liberally, and not to subject them to any over-nice and critical refinements." He reiterated in *Blanchard v. Sprague*, 3 F. Cas. 648 (1839) that the English courts tended to be hostile towards patent grants, but "in

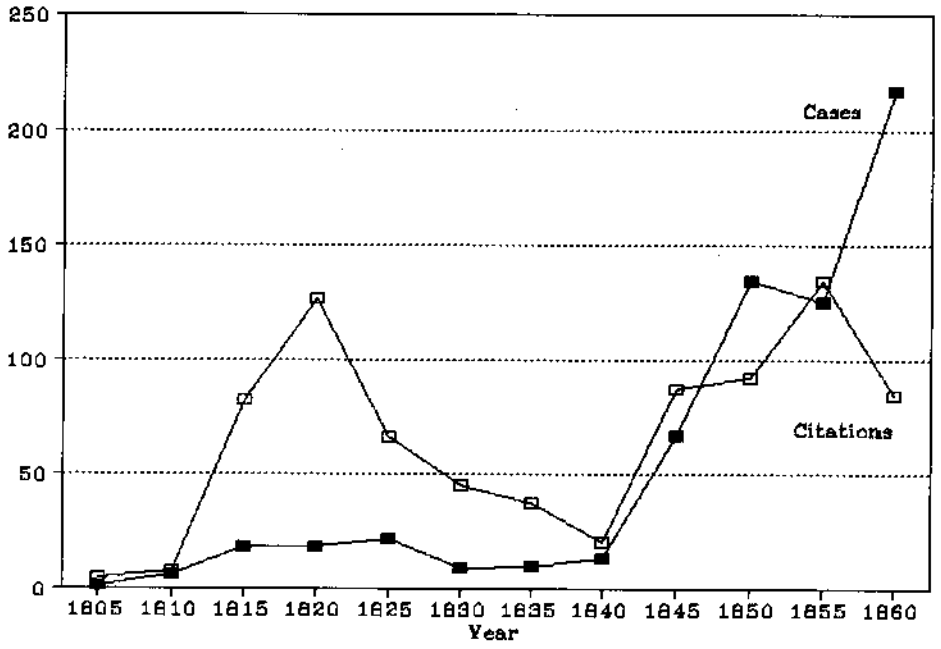

FIGURE 1

PATENT LITIGATION: CITATIONS AND CASES, 1790–1860

Notes and Sources: The citations were obtained from the *Federal Reporter* and Mead Data Central, *Lexis*® Computer Database and include total counts of subsequent citations for cases tried in that year. Citations for the landmark case *Hotchkiss v. Greenwood*, 52 U.S. 248 (1851) were excluded, because the decision was first implemented in the 1870s.

Numerous reported decisions from the early courts clearly and repeatedly declared that patent rights were "sacred" and to be regarded as the just recompense to inventive ingenuity. Justice Joseph Story, the acknowledged patent expert of the Supreme Court, was responsible for 48 reported patent decisions during his tenure. He indicated in *Lowell v. Lewis*, 15 F. Cas. 1018 (1817) that "the proper duty of the court" was to ensure "that wrongdoers may not reap the fruits of the labor and genius of other men." Story's Supreme Court decision in *Ex Parte Wood and Brundage*, 22 U.S. 603 (1824) delineated the policy underlying the 1793 act, which allowed district courts the right to repeal patents if the patent had been fraudulently obtained, provided the claim to repeal was brought before the courts within three years of issuance of

America, this liberal view of the subject has *always* been taken, and indeed, it is a natural, if not a necessary result, from the very language and intent of the power given to Congress by the Constitution on this subject. . . . Patents, then, are clearly entitled to a liberal construction, since they are not granted as restrictions upon the rights of the community, but are granted to 'promote science and useful arts' " [my emphasis]. According to Justice Baldwin, *Whitney v. Emmett*, 29 F. Cas. 1074 (1831), "The silence of the [English] law left a wide field open to the discretion of courts. . . . But in this country the law is more explicit. The Constitution . . . is a declaration of the supreme law of the land . . . which leaves no discretion to the judges to assign or presume any other."

the patent. The relevant tenth section of the act was ambiguous, but Story's reference point was the Constitution itself. His argument was a logical extension of the care with which rights of patentees were secured by constitutional edict. "It would be somewhat surprising if, after such anxious legislation," he noted in this landmark decision, "there should exist in the act a clause which, in a summary manner, enables any person to repeal [the patentee's] patent, and thus sweep away his exclusive property." The act of 1793 therefore did not imply that the courts had the right to revoke summarily a patent; rather, it was in the nature of a *scire facias*, or a process to call for the repeal of a patent, which involved a trial by jury if the defendant (the patentee) should choose to contest the claim. In all cases, the burden of proof rested with those who wished to challenge the patent, and the challenger was liable for costs if judgement went against him.[27] Story emphasized in his decision that "the inventor has a property in his invention; a property which is often of very great value, and of which the law intended to give him the absolute enjoyment and possession . . . involving some of the dearest and most valuable rights which society acknowledges, and the Constitution itself means to favor."

The attitudes of the judiciary towards patent conflicts were primarily shaped by their interpretation of the monopoly aspect of the patent grant. In *Whitney et al. v. Emmett et al.*, 29 F. Cas. 1074 (1831), Justice Henry Baldwin contrasted the policies in Britain and America towards the patent contract. English Courts, he pointed out, interpreted the patent grant as a privileged exception from the general ban on monopolies.[28] Apart from this proviso, the judiciary had total discretion in interpreting and deciding the ends that would promote public welfare. The patent was seen as a trade-off, a bargain between the inventor and the public with a negotiable outcome. In contrast, in the United States the patentee was not recognized as a monopolist per se: "In England a patent is granted as a favor, on such terms as the King thinks proper to impose . . . Here a patent is a matter of right, on complying with the conditions prescribed by the law."[29] Baldwin argued that conflicts

[27] This system is called the English rule. See Plott, "Legal Fees," for a model suggesting that the English rule conveys perverse incentives that may escalate litigation, bounded only by bankruptcy of litigants. This may partly explain the behavior of inventors such as Goodyear, Whitney, Evans, and Sickels, who dissipated profits in litigation.

[28] The 1624 Statute of Monopolies viewed monopolies as pernicious, with the exception of limited grants to patentees (who were not necessarily inventors of the patented device). The patent was thus granted as a privilege from the Crown, rather than as a right. The Supreme Court decision for *Pennock v. Dialogue*, 27 U.S. 1 (1829) emphasized that "in the courts of the United States, a more just view had been taken of the rights of inventors. The laws of the United States were intended to protect those rights, and to confer benefits; while the provisions in the statute of England, under which patents are issued, are exceptions to the law prohibiting monopolies. Hence, the construction of the British statute had been exceedingly straight and narrow, and different from the more liberal interpretation of our laws."

[29] Other judges concurred that "patentees are not monopolists . . . A monopolist is one who, by

between private and social benefit did not exist under the United States statutes, governed as they were by Acts of Congress that clearly recognized the property in ideas and inventions to be private and exclusive. Rather, the explicit intention of the patent law was to benefit the inventor, in the belief that maximizing individual welfare led to maximum social welfare.[30]

Baldwin's statement conveys an exaggerated assessment of the matter, because its logical extension would be to grant the inventor a monopoly in perpetuity. Still, its general tenor does echo the legislative attitude of the time. Some have claimed that the courts and the patent system alike were indifferent about whether the patentee was able to appropriate the benefits from his efforts.[31] However, there is evidence to show that a major concern of these institutions was to ensure that inventors were amply rewarded. For example, policies towards the term of the patent mirror this concern, for it was recognized that the length of the patent affected the profitability of the invention. The patentee gained exclusive rights for 14 years, but this period could prove inadequate for inventors to capture the returns from discoveries of great commercial value. Congress therefore reserved the right in such cases to extend the life of the patent. For instance, Amos Whittemore's cotton card machine was covered by a patent due to expire in 1811. Although efforts to infringe on his claim proved fruitless, he failed to recover his expenses and applied to Congress in 1809 for an extension. His discovery was acknowledged to be valuable to the country, and there

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the exercise of the sovereign power, takes from the public that which belongs to it, and gives to the grantee and his assigns an exclusive use. On this ground monopolies are justly odious. . . . Under the patent law this can never be done. No exclusive right can be granted for anything which the patentee has not invented or discovered. If he claim anything which was before known, his patent is void, so that the law repudiates a monopoly. The right of the patentee entirely rests on his invention or discovery of that which is useful, and which was not known before. And the law gives him the exclusive use of the thing invented or discovered, for a few years, as a compensation for 'his ingenuity, labor, and expense in producing it.' This, then, in no sense partakes of the character of monopoly," *Allen v. Hunter*, 6 McLean 303 (1855). "Probably of all species of property, this property in patent rights should be most carefully guarded and protected, because it is so easily assailed. . . . Now, patents are not monopolies. . . . A patent is that which brings out from the realm of the mind something that never existed before, and gives it to the country," *Singer v. Walmsley*, 1 Fish. 558 (Md. 1859).

[30] Justice Baldwin approvingly cited an English decision, that "nothing could be more essentially mischievous, than that questions of property between A and B, should ever be permitted to be decided upon considerations of public convenience or expediency." See also *Whittemore v. Cutter*, 1 Robb 28 (1813); and *Lowell v. Lewis*, 15 F. Cas. 1018 (1817), in which Justice Story discusses the common view that the public benefits from the ownership of the idea once the patent expires. However, according to sec. 6 of the 1793 Patent Act, it was immaterial whether the patent was described fully enough to enable a skilled mechanic to recreate the invention, unless the defective description were intended to deceive the public. Story enforced this section of the statutes even though, as he pointed out, an accidental omission negated the benefit to the public after the expiration of the patent as effectively as a defective description due to fraud: "We must administer the law as we find it."

[31] Lubar supports his viewpoint in "New, Useful and Non-Obvious."

was some discussion of a perpetual grant; but Congress finally authorized a renewal of 14 years from the expiration of the original patent. At the end of this period, the Whittemore enterprise sold several of its machines in anticipation of a rapid decline in the business, as the monopoly could no longer be retained. Varying the term of the patent in this manner enabled patentees of important inventions to extract a higher potential income from their discoveries than was possible for "mere gadgets."[32]

If the early courts were indeed conscious of the importance of defending private property in inventions and of securing the profits of patentees from infringement, one might ask why patentees would ever receive an adverse ruling. One answer is that property rights are delimited by the law and must conform to the law, which thereby defines what constitutes a true invention. Second, although judges supported property rights in invention, they were also conscious that their decisions affected a wider class of patentees and patent rights than merely those of the litigants before the court. As *Wilson v. Rousseau*, 45 U.S. 646 (1846) stressed, "we are not dealing with the decision of the particular case before us, though that is involved in the inquiry, but with a general system of great practical interest to the country; and it is the effect of our decision upon the operation of the system that gives to it its chief importance." Third, it is simplistic to assume that a verdict against the plaintiff indicated an antipatent stance, when in many cases both plaintiffs and defendants owned valid patents. In such cases, as Justice Levi Woodbury stated, "they both have a right to have these patents protected, so far as they can be, without conflicting with each other."[33]

Table 6 illustrates these points by examining the identities of plaintiffs and defendants, and shows the distribution of issues and outcomes from a sample of 372 lawsuits before the lower courts and the Supreme Court. These data reinforce the conclusion that the win/loss ratio is of limited value in assessing the enforcement of property rights in inventions. The typical lawsuit brought before 1840 involved a patentee bringing a lawsuit against the owners of a business that allegedly infringed on his patent. However, after this period the number of assignees increases markedly, both as plaintiffs and defendants. Eleven percent of defendants were assignees, but they were responsible for 30.5 percent of appeals to the Supreme Court. The disproportionate numbers appealing

[32] The policy of varying the term of the patent according to value was continued in the statutes of 1832 and reiterated in the Patent Act of 1836. The patentee was required to show a statement of the ascertained value of the invention and his loss and profit. The Patent Act of 1836 instructed that the public interest should be considered before granting extensions; but at the same time, "it is just and proper that the term of the patent should be extended, by reason of the patentee, without neglect or fault on his part, having failed to obtain, from the use and sale of his invention, a reasonable remuneration for the time, ingenuity and expense bestowed upon the same, and the introduction thereof into use."

[33] *Colt v. Massachusetts Arms Co.*, 6. F. Cas. 161 (1851).

TABLE 6
THE DISTRIBUTION OF COURT CASES, 1800–1860

PLAINTIFFS, DEFENDANTS, ISSUES, AND OUTCOMES

	Lower Courts						Supreme Court					
	1800–1839		1840–1860		All		1800–1839		1840–1860		All	
	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)	(#)	(%)
Plaintiff												
Patentee	40	81.6	156	59.1	196	62.6	7	70.0	19	38.8	26	44.1
Assignee	8	16.3	101	38.3	109	34.8	1	10.0	16	32.7	17	28.8
Licensee	—	—	3	1.1	3	1.0	—	—	2	4.1	2	3.4
Independent manufacturer	—	—	1	0.4	1	0.3	2	20.0	12	24.5	14	23.7
Unknown	1	2.0	3	1.1	4	1.3	—	—	—	—	—	—
Defendant												
Patentee	8	16.3	24	9.1	32	10.2	2	20.0	15	30.6	17	28.8
Assignee	3	6.1	31	11.7	34	10.9	—	—	18	36.7	18	30.5
Licensee	3	6.1	26	9.8	29	9.3	1	10.0	3	6.1	4	6.8
Independent manufacturer	31	63.3	128	48.5	159	50.8	6	60.0	13	26.5	19	32.2
Unknown	4	8.2	55	20.8	59	18.9	1	10.0	—	—	1	1.7
Issue												
Infringement	31	63.3	105	39.8	136	43.5	7	70.0	25	51.0	32	54.2
Injunction	5	10.2	106	40.2	111	35.5	—	—	3	6.1	3	5.1
Damages/costs	3	6.1	8	3.0	11	3.5	1	10.0	5	10.2	6	10.2
Jurisdiction/procedural	3	6.1	16	6.1	19	6.1	—	—	8	16.3	8	13.2
Contract	3	6.1	7	2.7	10	3.2	—	—	7	14.3	7	11.9
Other	4	8.2	22	8.3	26	8.3	2	20.0	1	2.0	3	5.1
Decision												
Plaintiff won	15	32.6	147	56.8	162	53.1	—	—	14	28.6	14	23.7
Reasons why defendant won												
Did not infringe	2	4.4	44	17.0	46	15.1	1	10.0	11	22.5	12	20.3
Patent void	15	32.6	12	4.6	27	8.9	2	20.0	3	6.1	5	8.5
New trial	7	15.2	22	8.5	29	9.5	2	20.0	5	10.2	7	11.9
Procedural issue	2	4.4	7	2.7	9	3.0	—	—	4	8.2	4	6.8
Jurisdiction	1	2.2	5	1.9	6	2.0	2	20.0	4	8.2	6	10.2
Plaintiff lacks title	1	2.2	7	2.7	8	2.6	1	10.0	—	—	1	1.7
Insufficient grounds	2	4.4	9	3.5	11	3.6	2	20.0	7	14.3	9	15.3
Other or no decision	1	2.2	6	2.3	7	2.3	—	—	1	2.0	1	1.7
Validity of Patent												
Held void	15	31.9	13	4.9	28	9.0	2	20.0	4	8.2	6	10.2
Upheld	12	25.5	100	38.0	112	36.1	1	10.0	12	24.5	13	22.0
Validity not at issue	10	21.3	119	45.2	129	41.6	5	50.0	30	61.2	35	59.3
No decision	10	21.3	31	11.8	41	13.2	2	20.0	3	6.1	5	8.5

TABLE 6—continued

GROUNDS FOR CHALLENGING VALIDITY OF PATENT

	1800–1839		1840–1860		All	
	(#)	(%)	(#)	(%)	(#)	(%)
Novelty/original inventor	15	36.6	100	65.8	115	59.6
Specification	17	41.5	21	13.8	38	19.7
Prior use/abandonment	3	7.3	14	9.2	17	8.8
Extension/reissue	3	7.3	13	8.6	16	8.3
Other	3	7.3	4	2.6	7	3.6

Notes: The data comprise a sample of reported lawsuits included in the *Lexis*® Computer Database. The total number of cases in the table is 372 (59 Supreme Court cases; and 313 lower court cases, which include three district court cases and 310 circuit court cases). I have omitted interference cases (which involve appeals made from the decision of the Commissioner of Patents in disputes between two inventors who both claim priority in making an invention), because the sole issue was whether a particular applicant should be given a patent—the grant of a patent in an interference process could not revoke the rights of an already granted patent—and *ex parte* appeals from decisions by the Commissioner of Patents. Totals vary because of missing variables in some categories of the table. See the Appendix for a description of individual variables.
Source: Mead Data Central, *Lexis*® Computer Database (Dayton, 1994).

lower court decisions to the Supreme Court suggest a more aggressive strategy of pursuing patent rights, especially relative to independent manufacturers and enterprises (who did not own any patents).

The intricate patterns of assignment revealed in litigation records shed some light on attitudes towards patentees and the degree to which patent rights were enforced. The development of trade is predicated on recognized rights of property; the market for patent rights, therefore, also signals the existence of enforceable property claims in antebellum inventions. Both Patent Office assignment records and law reports reveal that an extensive and deep market in patent assignments and licenses functioned during this period. The Patent Office recorded 2,108 assignments in 1845 alone, almost 15 percent of cumulative patent awards up to that year.[34] Secondary (and tertiary) markets in patent rights flourished, sanctioned by law from the inception of the patent system, involving complex networks of subdivided rights that were bought, resold, and even bequeathed.[35] Whittemore, for example, sold

[34] See, for instance, *Potter v. Holland*, F. Cas. 1160 (1858), where Allen Wilson's improvement for sewing machines was involved in some eight transactions within five years. The patent right itself could not be subdivided, but undivided parts could be limited by territories. Although assignees of partial interest in the patent were treated as licensees, they could bring equitable suits for injunctions against infringers (*Ogle v. Ege*, 4 Wash. 584 [1826]). The figure for assignments is from the U.S. Patent Office, *Annual Report of the Commissioner of Patents*, 1846.

[35] The Patent Act of 1793 had allowed "the assignee, having recorded the said assignment in the office of the Secretary of State, shall thereafter stand in the place of the original inventor, both as to right and responsibility, . . ." as did assignees of assignees. Assignees of overlapping patents mutually reassigned rights in some instances to avoid potential litigation. For a description of such an 1829 patent pool, see *Wilson v. Rousseau*, 45 U.S. 646 (1846).

his patent rights to his textile card machinery in 1812 for $150,000.[36] If early nineteenth-century patents were indeed unenforceable, it is unlikely that patent rights would have been assigned for such large sums, or resold at even higher prices.

The judiciary united in ranking "mere licensees" (who did not own the property rights to the patent) below assignees and patentees, but still evinced some ambivalence about the rights of assignees. Courts reserved the right to treble damages due to inventors, but assignees could only recover actual damages. Some judges contended that "sacred rights of property and genius" did not apply entirely to assignees, secular maximizers who dealt with the patent right as a matter of business and speculation. Patents could be extended by patentees, never by assignees or licensees. In the eastern circuit, Justice Story had argued that the benefit of patent renewals should not be granted to assignees unless so specified in the assignment contract, whereas in the middle circuit, Chief Justice Roger Taney held otherwise. As insurance, assignees occasionally brought their suit to term under the aegis of the inventor (perhaps with a token appearance in court for dramatic effect, as counsel for one of Samuel Morse's assignees suggested). This distinction between assignees and inventors does underline that inventors and inventive property were regarded as an especially "meritorious class."[37]

The courts distinguished between conflicts involving patentees on both sides—where enterprises operated under competing patents—and conflicts in which the patent right was deliberately infringed. In the latter instance "vindictive damages" were granted, but awards for damages tended to be mitigated or dismissed if the infringement was unknowing or if the defendant was operating with the sanction of another patent. Such decisions undoubtedly led to frustration on the part of the patentee whose rights were infringed. For instance, William Livingston appealed the verdict of the lower court assessing damages at almost $4,000 for his infringement of William Woodworth's patent in *Livingston v. Woodworth*, 56 U.S. 546 (1853). The Supreme Court upheld his appeal against damages because the infringer was the assignee of a patent filed by James Hutchinson; this, the court felt, indicated that the act was not one of "wanton infringement." Nevertheless, when infringement was clearly in violation of patentee rights, judicial interpretation followed the spirit rather than the technicalities of

[36] Howe, *Memoirs*.

[37] For a case making reference to "the interests of meritorious assignees," see *Blanchard's Factory v. Warner*, 3 F. Cas. 653 (1846). Justice Nelson pointed out that "the assignees of the original patentee are frequently most instrumental in putting the invention into general use, and bringing it successfully before the public, by the expenditure of their time and money. More than half, probably, of the useful patented inventions have been thus brought into general public use, the successful results operating, directly or indirectly, for the benefit and interest of patentees."

the law. For instance, infringers were not allowed "colorable evasions" by switching their operation to another location: "Where a party has been enjoined from the use of a machine in one district, its use in another district . . . will not be allowed while the injunction against him remains in full force."[38]

Research that relies solely on data about outcomes to make inferences about patent property rights is overly simplistic, moreover, because it assumes that plaintiffs pursue only one objective—that of obtaining a settlement. But Table 6 indicates that damages were at issue in less than 5 percent of all lower court cases. In cases where the validity of the patent was challenged, the stakes for the plaintiff were much greater than the damages awarded in any specific lawsuit, because the decision to uphold his patent supported his claims over all users of his invention. It should be noted, however, that in many of these lawsuits the patentee's right was not challenged; indeed, the validity of the patent was not disputed in more than half of the cases in which a decision was reached, and between 1840 and 1860 the percentage of cases in which the patent right was challenged fell. In 15.1 percent of lower court cases and 20.3 percent of Supreme Court cases, the patent was held valid, but the defendant obtained a favorable verdict because he was held not to have infringed the patentee's invention.

Even if the case was lost, the wording of the decision sometimes upheld the patent right. As Justice Baldwin emphasized, a verdict against the patentee did not necessarily imply that the patent property was invalidated, merely that he could not recover his claims regarding that specific lawsuit. For instance, Cyrus McCormick, who made a fortune from royalties and manufacturing profits for his agricultural machines, lost his claim of infringement against John Manny before both the lower courts and the Supreme Court, where the case was taken on appeal in 1857. Before dismissing the charge in *McCormick v. Manny*, 15 F. Cas. 1314 (1856), Justice John McLean noted in his summing up that "having arrived at the result, that there is no infringement of the plaintiff's patent by the defendant, as charged in the bill, it is announced with greater satisfaction, as it in no respect impairs the right of the plaintiff. He is left in full possession of his invention, which has so justly secured to him, at home and in foreign countries, a renown honorable to him and to his country." Although Manny's harvester invention was ruled to be different and thus noninfringing, McCormick was still able to enforce his rights against unauthorized users of his own patented invention.

In the period from 1800 to 1840 patents were held void in a higher fraction of cases. However, this figure is only tangentially related to the attitudes of the courts towards patent rights. First, the total number of

[38] *Woodworth v. Edwards*, 30 F. Cas. 567 (1847).

patents involved is low, and the percentage is distorted by an outlier (Oliver Evans's flour mill patent accounted for some 12 lawsuits, 7 of which were decided against him). Second, as previously indicated, many of these decisions would be adopted as precedent by later courts. Third, if the patent was held void on the grounds of a technicality, some inventors had the option of obtaining a reissued patent.[39] Fourth, an examination of the individual cases suggests that patentees in the early period were unfamiliar with the newly established laws. Two of the cases in which patents were invalidated related to inventors who had obtained more than one patent for the same invention; a third lawsuit was brought by an inventor who challenged the right of his co-inventor to claim as his sole property a patent for a discovery that had been the result of their joint efforts.[40]

Table 6 also considers the grounds for challenging the validity of patents and supports the view that patentees in the early period were unfamiliar with the new laws, especially with regard to the role and format of the patent specification.[41] Only 13.8 percent of cases from 1840 to 1860 were primarily concerned with the accuracy and extent of the patent specification, whereas this issue motivated 41.5 percent of the early cases. Many of the early patent cases were lost because of overly broad specifications that failed to distinguish between the inventor's contribution and the original device.[42] The decision to void patents on these grounds was made because faulty specifications fostered monopolies by claiming what had already belonged to others, and because they

[39] In *Moody v. Fiske*, 1 Robb 312 (1820), Paul Moody brought a suit against infringers of his 1819 patented improvements on the double-speeder for roping cotton. Moody lost the case because, contrary to the patent laws, he had bundled improvements on two machines in the one patent; however, he was able to withdraw the voided patent and was awarded a reissued patent with a more accurate specification. The case was tried the following year under the new patent, and Moody was awarded punitive damages. The statutes explicitly incorporated an option to obtain a reissue in sec. 3 of the 1832 Act, but this merely legitimized rules that the courts had already established in cases like *Morris v. Huntington*, 17 F. Cas. 818 (1824); and *Grant v. Raymond*, 31 U.S. 218 (1832). The reissue was intended solely to correct the original patent, and could not be used to enlarge its claims, although the specification could be amended to omit previous improvements. Assignees' rights were protected in the event of a reissue.

[40] See *Odiorne v. Amesbury Nail Factory*, 18 F. Cas. 578 (1819); *Morris v. Huntington*, 17 F. Cas. 818 (1824); and *Stearns v. Barrett*, 22 F. Cas. 1175 (1816).

[41] The English legal system also experienced similar early difficulties, which were resolved as patentees became more familiar with the requirements and as patent agents grew in number. The implication is that certain features of the legal institution were independent of the attitudes of the courts, and could only be resolved with time and improved familiarity with the structure of law. Thomas Blanchard was nonsuited through two mistakes in his renewed patent, rectified the defects, and was awarded a decision on retrial of the case. "His honor Judge Story, on making his remarks, paid the following high compliment to Mr. Blanchard, viz.: 'That after much trouble, care, and anxiety, he will be enabled to enjoy the fruits, unmolested, of his inventive genius, of which he had a high opinion; and it afforded him much pleasure in thus being able publicly to express it' " (Howe, *Memoirs*, p. 210).

[42] Although defense counsel were creative in their attempts to undermine the patent grant (offering 20 grounds for invalidation, in one instance), the summary statements of the court tended to be more focused, so it was possible to isolate one predominant reason for the decision.

projected inaccurate information to potential inventors: "Specification should be complete so as not to injure other inventors" (*Whitney v. Emmett*, 29 F. Cas. 1074 [1831]). This position was entirely consistent with policies that fostered the rights of *all* patentees, including those who did not have cases before the courts.[43] Although a patent was limited to the extent of its published claims, judges united in interpreting those claims in favor of the patentee. According to Chief Justice Marshall, "In the construction of a patent, where the words are ambiguous, the intention of the parties is entitled to great consideration" (*Evans v. Eaton*, 16 U.S. 454 [1818]), and other courts concurred that "patents should be construed liberally to support the claims of meritorious inventors."[44]

The most frequent grounds for challenging patents from 1800 to 1860 involved questions about the novelty of the invention and whether the patentee was the "first and true" inventor. The courts supported a Lockean natural rights view of inventive property: the first to conceive of an idea and reduce it to practical use had the exclusive right to profit from the invention. The major criterion of the judiciary was thus the identification of the first individual to have made a workable version of a device that was likely to have been the object of the efforts of a large number of talented individuals.

Patentees also lost the case if challengers could prove that the patent lacked novelty. The issue of novelty was related to the wider question of what constituted a true invention, as described by the patent statutes. Justice Story considered this problem in *Earle v. Sawyer*, 8 F. Cas. 254 (1825), in the context of an improvement which was acknowledged to be new, but was contested on the grounds that it was too obvious an invention to warrant a valid patent. Story rejected the supposition that a true invention required an "instantaneous flash of mind," as long as the inventor distinguished his discovery from prior art, and that discovery was new and not used before. Even if each component had been known before, the invention was valid as long as the combination was previously unknown. However, putting an existing invention (such as ether) to a new use (as an anaesthetic) was not itself patentable. According to the 1793 statutes, merely superficial changes in form,

[43] For instance, Judge Smith Thompson's decision against a patentee who overclaimed was expressed as follows: "I am compelled most reluctantly to come to the conclusion that the plaintiff has undertaken to secure more than he has a right to claim, and in the view of the law he cannot recover. . . . I regret this result. . . . I would protect him if I could conscientiously do so." *Stanley v. Hewitt*, 22 F. Cas. 1043 (1836).

[44] Over 65 decisions specifically instructed the jury in the liberal interpretation of patentee rights. See, for example, *Blanchard v. Sprague*, 3 Sumn. 535 (1839); *Brooks v. Bicknell*, 3 McL. 250 (1843); *Parker v. Stiles*, 5 McL. 44 (1849); *Corning v. Burden*, 15 How. 252 (1853); *Davoll v. Brown*, 1 W. & M. 53 (1845); *Parker v. Sears*, 1 Fish. 93 (1850); *Wintermute v. Redington*, 1 Fish. 239 (1856); *Goodyear v. Providence Rubber Co.*, 2 Cliff. 351 (1864); *Latta v. Shawk*, 1 Bond 259 (1859); *Washburn v. Gould*, 2 Robb 206 (1844); and *Emerson v. Hogg*, 2 Blatchf. 1. (1845).

matter, or proportion to obtain the same result was not a discovery: "substantial" novelty was therefore the major prerequisite.[45]

Another reason for challenging a patentee's case depended on whether the patentee had used the invention before obtaining a patent. It might be argued that a system that defends original inventors (unlike England) also encourages secrecy and diminishes the value of obtaining a patent.[46] However, both the law and the judiciary followed the Constitution in the belief that patented inventions were pivotal in gaining industrial and economic leverage; thus, they strongly favored promptness in obtaining a patent. Undue delay jeopardized the inventor's position against infringers and increased the risk of having the patent voided on the grounds of prior use, or abandonment. Inventors who did not take out patents, the Supreme Court ruled in *Pennock v. Dialogue*, 27 U.S. 1 (1829), were not entitled to legal protection.[47] Inventors were well advised not only to obtain patent protection, but

[45] From the point of view of the patentee, the substantial novelty requirement possibly led to some ambiguity when dealing with individuals attempting to patent around an existing invention, especially if substitution resulted in such greater efficiency that it amounted to a new patentable invention in itself. However, in *Gray v. James*, 1 Robb 120 (1817), the defendants argued unsuccessfully that they had improved on, rather than infringed, Jacob Perkins's "useless" nail-cutting machine. In *Wilbur v. Beecher*, 29 F. Cas. 1181 (1850), Justice Samuel Nelson also ruled that relative efficiency should not be given great weight in a judgment against infringers because a subsequent user, with the benefit of time and experience, could always improve on the original invention. See also *Kneass v. Schuylkill Bank*, 1 Robb 303 (1820); *Detmold v. Reeves*, 7 F. Cas. 547 (1851); and *Poppenhausen v. New York Gutta Percha Comb Co.*, 4 Blatch. 253 (1859). Moreover, in accordance with the congressional statutes, James Stimpson's 1831 patent was held not to be infringed by an invention using some of the elements of his railroad invention in conjunction with an element that was substantially different in form (*Stimpson v. Balt. & Susq. Railroad Co.*, 10 How. 329 [1850]). A further noteworthy clause of the patent act ruled that alien residents lost their rights if they failed to employ the patent usefully, although such restrictions did not apply to citizens of the United States. See *Tatham v. Loring*, 5 N.Y. Leg. Obs. 207 (1845). For an excellent discussion of the standards for patentability, see Burchfiel, "Pseudohistory."

[46] The English Statute of Monopolies granted the right to a patent for the "sole working and making of new manufactures." Hence, the emphasis was on the nature of the invention rather than the inventor, and patents could be granted to noninventors such as the importers of inventions new to England.

[47] *Pennock v. Dialogue*, 27 U.S. 1 (1829): "If an inventor should be permitted to hold back from the knowledge of the public the secrets of his invention; if he should, for a long period of years, retain the monopoly, and make and sell his invention publicly; and thus gather the whole profits of it, relying upon his superior skill and knowledge of the structure; and then, and then only, when the danger of competition should force him to procure the exclusive right, he should be allowed to take out a patent, and thus exclude the public from any further use, than what should be derived under it, during his fourteen years; it would materially retard the progress of science and the useful arts; and give a premium to those who should be least prompt to communicate their discoveries." Justice John McLean delivered the majority opinion in *Shaw v. Cooper*, 32 U.S. 292 (1833), urging that "vigilance is necessary to entitle an individual to the privileges secured under the Patent Law. It is not enough that he should shout his right by invention, but he must secure it by law." This decision confirmed prior ruling on the issue: "No man is permitted to lie by for years and then take out a patent. If he has been practising the invention with a view of improving it, . . . that ought not to prejudice him. The intent of the delay is a question for the jury, also whether allowing use before patent does not amount to abandonment to the public," *Morris v. Huntington*, 17 F. Cas. 818 (1824). Many inventors filed caveats in the Patent Office to record their progress on the invention long before formally filing for a patent.

also to demonstrate "reasonable diligence" in so doing. After 1839 the law permitted inventors to defer applying for a patent for two years so they could work on reducing the invention to practical use. Delays for other reasons could still, however, jeopardize the inventor's ability to secure a patent grant for his invention. Walter Hunt, one of the first to be involved in developing a viable sewing machine, sold his unpatented improvement in 1834. He was later refused a patent for the invention, on the grounds that he had abandoned it to the public by virtue of the sale. The rulings against prior use and abandonment ensured that property rights in invention were vested in patents rather than in secret processes and expanded the information set available to potential inventors. At the same time, they increased the risks inherent in inventive activity directed towards longer-term payoffs.

The patent laws had specified that patents were to be granted for "new and useful" inventions, but nineteenth-century judges adopted a laissez-faire approach to the issue of the utility of the invention. In the 1817 case, *Lowell v. Lewis*, 15 F. Cas. 1018, Justice Story charged the jury that the utility of the invention "is a circumstance very material to the interest of the patentee, but of no importance to the public. If it is not extensively useful, it will silently sink into contempt and disregard."[48] It was thus the role of the market, rather than the courts, to determine the ultimate success of the patent. Consequently, Story instituted the non-negative ruling that "all the law requires is that the invention should not be frivolous or injurious to the well-being, good policy, or sound morals of society." This policy was continued by the Patent Office, which also did not attempt to gauge the social or technical value of an invention, deciding conflicting claims predominantly on the basis of novelty.

However, as Justice Story stressed, the utility of the invention was of great interest to transactors in the market. According to the law, therefore, sale of property rights in the patent was held to be dependent on the value of the patent. Proof that the patent was of no utility was sufficient to void any contract to transfer those rights: "A lack of utility in a patented improvement may avoid a promissory note given for a conveyance of an interest in the patent" (*Burnham v. Brewester*, 1 Verm. 87 [Vt., 1828]); and "If a patented thing be wholly useless, that

[48] The question of utility arises from the Constitutional phrase, "the useful arts;" the statutes likewise permit patents for "new and useful" discoveries. Justice Story's ruling in *Lowell v. Lewis* was maintained by later courts as the legal standard: "The law, however, does not look to the degree of utility; it simply requires that it shall be capable of use," *Bedford v. Hunt*, 1 Robb 148 (1817); and "The popular demand for an article is, in the long run, the best test for utility," *Turrel v. Spalth*, 14 O.G. 377 (1878). In any event, nonutility was hardly the most cogent defense against the patent right, for "where the defendant has used the patented device, it does not lie in his mouth to dispute its utility," *Lowell v. Lewis* (1817). I have read only one case, *Langdon v. de Groot*, 14 F. Cas. 1099 (1822), that was dismissed on the grounds of lack of utility. See, however, the discussion in the Michigan case, *Page v. Ferry*, 1 Fish. 298 (1857).

will avoid a promise to pay money for an interest in the patent" (*Fallis v. Griffith*, Wright 303 [Ohio, 1833]). The secondary market in patent rights was thus based on the legally valid assumption that the patent embodied some intrinsic technical value. This implies that the relatively deep market in patent assignments did not merely reflect speculative bubbles, but investments in productive capital.

LOGIT ANALYSIS OF LEGAL SYSTEM

> *It cannot be doubted by any, I think, that the securing of property in inventions is essential and highly promotive of the advance of our country. . . . Nothing more stimulates effort than security in the result of effort.*
>
> —Benjamin Harrison, U.S. President (1891)

Critics have argued that the early American patent system was ineffective for a number of reasons, including a prejudiced legal system. As we have seen, these arguments were based primarily on an inappropriate analysis of the percentage of cases won by patentees. Evidence presented in the previous section suggests that early decisions were not rejected by later, allegedly more liberal courts, but were incorporated as precedent in subsequent patent cases. My examination of the qualitative aspects of reported patent cases also revealed a judiciary concerned with defending patentees' rights and with ensuring that inventors could capture returns from their discoveries. The litigation records, moreover, describe widespread trade in inventions, suggesting a common recognition that property rights could be enforced.

Although quantitative evidence of litigated cases provides an inadequate measure of judicial attitudes towards the wider universe of patent disputes, the within-litigation sample of cases may nevertheless prove informative about *relative* enforceability. In this section I present a multivariate logit model in which the dichotomous dependent variable, DECIDE, represents the likelihood of a verdict for the patentee in the courts. Maximum-likelihood methods yield the reported coefficients, β_i, which represent the log-odds of a favorable decision conditional on the vector of independent variables, X (Table 7). The model allows us to test the following hypotheses about litigated patent cases: 1) legal decisions were consistent across regions, tending to increase the degree of certainty in the system; 2) the change in the patent system in 1836 altered the population of patents litigated and thus affected the probability of a decision favoring the patentee; 3) the patent right was effective for minor inventions, but not for important discoveries; 4) common law courts, where patent rights were debated, would tend to generate more favorable decisions relative to courts of equity and the Supreme Court.

TABLE 7
LOGIT REGRESSIONS
(dependent variable = DECIDE[a])

Independent Variables	(1)	(2)
INTERCEPT	−0.279	−0.199
	(0.79)	(0.32)
CIRCUIT Dummies		
FIRST	−0.249	−0.252
	(0.69)	(0.60)
SECOND	−0.141	−0.139
	(0.24)	(0.21)
THIRD	−0.364	−0.461
	(1.13)	(1.64)
COURTS		
EQUITY	−0.202	−0.319
	(0.82)	(1.89)
SUPREME		−1.162
		(9.43)***
SUPT2	−0.939	
	(2.36)	
SUPT3	−1.160	
	(7.71)***	
LAW36	0.898	0.739
	(9.78)***	(6.72)**
LOGFREQ		0.164
		(4.74)**
	−2 Log L = 591.1 ***	−2 Log L = 582.8 ***

* = Significant at the 5 percent level.
** = Significant at the 1 percent level.
*** = Significant below the 1 percent level.
[a] Probability of verdict for patentee
Notes: Numbers in parentheses are Wald Chi-square statistics. The coefficients represent the log-odds of a verdict for the patentee. The sample totals 444 cases, with a value of zero if the case was decided against the patentee, and a value of one if the decision was in favor of the patentee's claims before the court. The data exclude *ex parte* and interference appeals from decisions by the Commissioner of Patents.
Sources: See the text and the Appendix for definition of variables and sources.

The dummy variables representing different circuits in the logit regressions reveal an overall consistency between regional decisions, especially in New England and New York, where 58.8 percent of all reported litigation occurred. Patentees were less likely to recover in Pennsylvania, but the difference is not statistically significant. Dummy variables representing individual judges were also statistically insignificant, which is likewise compatible with uniformity in judicial decisions. The implication is that the delegation of patent issues to the federal level did indeed foster a national market in patent rights, as the framers of the commerce clause intended. The tendency towards ultimately consistent policies across regions mitigated the uncertainty of patentees whose inventions were used throughout the country. As early as 1807, Oliver Evans of Philadelphia prosecuted his patent claim before courts in

Maryland and Virginia, as well as in his native Pennsylvania, whereas the Blanchard lathe was contested in at least five states.[49]

In the previous section I also argued that observed outcomes were related less to the attitudes of the judiciary and more to features of the patent claim specified by congressional statutes, which had defined true invention in terms of novelty and utility. However, the registration system of 1793 undoubtedly created difficulties because of a mismatch between patent grants and "new and useful" inventions. Judges attempted to maintain incentives under this system by sending strong signals that only patent rights in inventions that conformed with statutory requirements would be maintained and enforced. The 1836 law, which introduced the change from a registration to an examination system, did increase the probability of a favorable outcome for plaintiffs, according to the results for the LAW36 variable.[50] The model presented in Table 7 explains the variation in outcomes better than the alternative specification of a continuous time trend, supporting the view of a discrete change in 1836. Rather than a change in the attitudes of the courts toward enforceability, these results signal that the underlying system had altered to conform with the greater specialization and complexity of technical inputs into patent claims. The Patent Office would now filter out those claims that failed to meet the standards for novelty or patentability. As a result, a different population of cases would be brought for trial, and for different reasons.

Some researchers have argued that the patent system merely induces the creation of "marginal inventions." Similarly, according to Frank Prager, the legal system "discriminated and still discriminates against those who open and pioneer major fields, as distinguished from the inventors of gadgets."[51] The LOGFREQ variable, representing the frequency of litigation, is included as a proxy for important inventions. In an environment that was unambiguously supportive towards true inventors, a decision to uphold the right of any specific patentee conveyed a caveat to actual and potential infringers; it also provided an

[49] Thomas Jefferson, an unknowing infringer, was called to account by Evans for royalties due, according to Fouts, "Jefferson."

[50] It may be argued that the change in the legal features of the patent system was initially merely redistributive in effect. In the pre-1836 regime the burden of prosecuting a claim against infringement or interference was on the patentee. After 1836 infringement was still the domain of the courts, but interferences were decided by employees of the Patent Office, which was funded (and sometimes made a profit) from fees paid by patentees. The benefit to the patentees was equal to this sum, plus the cost of litigating interferences times the reduction in the probability of litigation due to screening by examiners (interferences). Given that this probability was very small in the first place, it is not entirely clear that the shift in the liability was of much social significance at the time. This is borne out quantitatively by the relatively minor fall in the time series of patent applications. However, as inventions became more technically complex, and as the Patent Office expanded its operations to include the dissemination of information, it may be expected that the relative efficiency of the post-1836 system increased. The point is that the efficiency of the later system does not imply the inefficiency of the former regime.

[51] Prager, "Trends."

inducement for litigants to settle out of court in future disputes about the patent.[52] The 210 inventions litigated in a single lawsuit were presumably settled out of court in subsequent disputes. Yet, as I have indicated, the phenomenon of multiple litigation was a notable feature of the American legal system. A list of frequently litigated inventions clearly represents inventions of exceptional commercial value. McCormick's harvester (9), the Blanchard lathe (11), Evans's milling patent (12), sewing machine patents filed by Singer and Allen B. Wilson (14), cotton gins (14), and Morse's telegraph (15) all proved to be as well known in the annals of litigation as in those of invention. Three outliers were even more controversial: the Parker waterwheel (21); Charles Goodyear's vulcanization of india rubber (21); and William Woodworth's planing machine, the subject of an astonishing 78 reported lawsuits.

The greater the value of any discovery, the greater the effort to circumvent the inventor's monopoly by contriving a new method to achieve the same effect. Whether or not infringers could successfully attack the patent depended on the courts, which followed a consistent policy of attempting to secure just rewards for individuals whom they recognized as public benefactors. Justice Robert Grier, in deciding for the plaintiff in *Adams v. Jones*, 1 F. Cas. 126 (1859), declared with open indignation that "it is only when some person, by labor and perseverance, has been successful in perfecting some valuable manufacture, by ingenious improvements, and labor-saving devices, that their patents are sought to be annulled by digging up some useless, musty, forgotten contrivances of unsuccessful experimenters." As the regression results imply, these unsuccessful experimenters tended to be equally unsuccessful at law. For instance, more than 70 percent of the Woodworth patent cases—litigated in 12 states—were decided in favor of his assignees.

"Great inventors" such as Whitney, Evans, and Goodyear were amply represented among litigation cases.[53] The per-patent rate of litigation for great-inventor patents was three times as high as the rate for ordinary patents, indicating that important patents had a much higher probability of being litigated. However, less than one-fifth of all great inventors were actually involved in litigation, and only 40, or 3 percent of their patents, were at issue. For the 80 percent who never appeared in the courts, it is likely that their patent rights and reputation were sufficient to ensure out-of-court settlements, or that patent in-

[52] Judges at times attempted to encourage litigants to settle out of court, especially when an injunction might result in the closure of large numbers of enterprises, as for example, in *Woodworth v. Edwards*, 30 F. Cas. 567 (1847). See also *Parker v. Brant*, 1 Fish. P.C. 58 (1850): "we feel a reluctance to stop two hundred mills . . . without giving the defendants a chance of making a settlement or compromise."

[53] For more details on "great inventors," see Khan and Sokoloff, "'Schemes'" and "Entrepreneurship."

fringement was not critical because returns could be extracted through other means. The higher litigation rate for great-inventor patents possibly occurred because these inventors employed litigation as a strategy to maintain (or extend) market share and preempt rivals, both actual and potential. An example is McCormick, who maintained a phalanx of lawyers full-time on his payroll. The proportion of *cases* in relation to total patents was 2 percent for all inventors, but amounted to 10 percent for great inventors. Since precedent was established in the first successful outcome, these plaintiffs may have been more interested in suppressing competitors and gaining monopoly rights than in defending their patent right per se. The records for the great inventors underline the conflict between monopoly grants and social welfare that later courts would recognize and attempt to resolve, especially in disputes before equity courts.

The negative coefficient on the EQUITY dummy variable suggests a lower likelihood of favorable decisions at equity relative to common law (the excluded variable). Justice Story, recognized as the greatest proponent of equity jurisprudence of the period, identified the most marked contrast between the United States and Britain as policies in Chancery, or before courts of equity. In England, Story pointed out, suits brought before Chancery were uncertain and dependent on the whims of individual judges. Unlike this "judge-made law," federal circuit courts in the United States had been granted original jurisdiction at law and at equity since 1819, and both were conducted on "scientific" principles of precedent.[54] Disputes about the validity of the inventor's property rights were the province of the common law courts alone—with the right of a trial by jury—and could not be decided at equity.

[54] Story, "Equity." Lubar, "Transformation," disagrees with Story: "The growth of equity—it's triumph over the common law—allowed judges to take patent law into their own hands. A hearing before a judge, followed by an injunction, became the general rule in patent cases." Compare the following opinions: "Equity jurisdiction over patents is in aid of the common law. . . . Whether the complainant's patent is good and valid so as ultimately to secure to him the right he claims, is not a question for decision upon the equity side of this court. That is a question which belongs to a court of law, in which the parties have a right of trial by jury," *Sullivan v. Redfield*, 1 Paine 441 (1825); "Where there is reasonable doubt as to the novelty of the patent or its infringement, a preliminary injunction will not be granted," *Winans v. Eaton*, 1 Fish. 181 (1854). See also *Woodworth v. Hall*, 2 Robb 495 (1846); *Potter v. Fuller*, 2 Fish. 261 (1862); *Brooks v. Bicknell*, 3 McL. 250 (1843); and *Hovey v. Stevens*, 1 W. & M. 290 (1846). These decisions all indicate that the equity courts were not viewed as independent of the common law. Moreover, as Justice Nathan Clifford pointed out, *Blanchard v. Sprague*, 1 Cliff. 288 (1859), Chancery jurisdiction and practice in the U.S. circuit courts were the same in all states. For patentees, "The prevention of a multiplicity of suits is one of the most salutary powers of a court of equity," *Thomas v. Weeks*, 7 F. Cas. 154 (1827). Justice Story stated that equity dealt with cases "in which a simple judgement for either party, without qualifications or conditions or peculiar arrangements, will not do entire justice *ex aequo et bono* to either party. Some modifications of the rights of both parties may be required; some restraints on one side, or on the other, or perhaps on both sides; some adjustments involving reciprocal obligations or duties" (Story, *Commentaries*, p. 27). Moreover, decisions at equity involved "the mixed question of public policy and private convenience" (ibid., p. 40).

TABLE 8
JURISDICTION IN PATENT CASES, 1790–1860

Decade	Common Law	Equity	Supreme Court	CP[a]
1790–1799	1	—	1	—
1800–1809	4	1	—	—
1810–1819	22	2	3	—
1820–1829	21	5	5	—
1830–1839	10	1	2	—
1840–1849	70	73	13	16
1850–1859	77	111	39	101
1860	13	7	1	33
Total	218	200	64	150

[a] Figures in CP are appeals from the Commissioner of Patents, including interferences and *ex parte* appeals against decisions of the Patent Office.
Sources: See the Appendix and the previous tables for sources.

Even though the same judge frequently presided in both courts, rulings in equity were a more complex matter because equitable disputes forced the courts to weigh the rights of the individual inventor against the rights of the community at large.[55]

The 1840s saw an increase in the number of patentees resorting to courts of equity to obtain temporary or permanent injunctions against unauthorized users of their inventions (see Table 8). Preliminary injunctions could also be obtained pending common law litigation if patentees stood to suffer severe losses. But judges were alert to the possibility of "irreparable harm to the defendant, in breaking up his trade or business" (*Goodyear v. Dunbar*, 1 Fish. P.C. 472 [1859]). Oliver Parker's request for a wholesale injunction against 100 millowners was disallowed. The Parker brothers' patent was within weeks of expiring; the judge was thus reluctant to issue an injunction that would adversely affect so many enterprises, when the patentee would receive no benefit from closure of the mills and would later be compensated by the payment of damages if it were indeed proven that the patent was infringed (*Parker v. Sears*, 1 Fish. 93 [1850]). In *Woodworth v. Hall*, 2 Robb 495 (1846), Justice Levi Woodbury ruled that where some doubt existed regarding the merits of the injunction, the courts should be inclined against, rather than in favor of the plea. The logit results for the EQUITY variable conform to Woodbury's ruling, and in general judges preferred to rule that either party post a bond as surety pending a decision at law.

In the absence of antitrust statutes, equity provided a more flexible channel for mediating between the inventor's exclusive rights and a general monopoly. The plaintiff in *Smith v. Downing*, 1 Fish. 54 (Mass.,

[55] The Supreme Court underlined this in *Kendall v. Winsor*, 21 How. 322 (1859): "Whilst the remuneration of genius and useful ingenuity is a duty incumbent upon the public, the rights and welfare of the community must be fairly dealt with and effectually guarded. Considerations of individual emolument can never be permitted to operate to the injury of these."

1850), an assignee of Morse, sought a permanent injunction against the defendants, who operated a telegraph under assignment from Royal E. House. After a detailed exposition of the incremental nature of the development of the telegraph, the court refused the injunction. Exclusive patent rights allowed the inventor to benefit from the acknowledged property in his improvement; at the same time, such property did not extend to the entire field, because this would grant the marginal improver a monopoly that would halt general progress in the area. House's telegraph was not only different from Morse's, but technically superior; hence to mandate an estoppel against his ingenuity and the defendants' enterprise would have been an "extraordinary" measure.

Decisions before the Supreme Court reveal a similar attempt to resolve the paradox of promoting rights in invention without suppressing economic progress. The variables SUPT2 and SUPT3 represent the interaction between a dummy variable for the Supreme Court, and the 1837 to 1849 and 1850 to 1860 periods respectively. The statistically significant negative coefficient for the 1850s relative to the earlier period suggests that the early insouciant judicial optimism about the coincidence between private and public welfare had begun to wane by the second half of the century.[56] By then the courts had experienced the network of litigation launched by patentees and their assignees, such as Woodworth and the Parker brothers, to protect national monopolies. Justice Woodbury was prompted to dictate (*Woodworth v. Edwards*, 30 F. Cas. 567 [1847]) that "the rights of inventive genius, and the valuable property produced by it, all persons in the exercise of this spirit will be willing to vindicate and uphold, without colorable evasions and wanton piracies; but those rights on the other hand, should be maintained in a manner not harsh towards other inventors, nor unaccommodating to the growing wants of the community."

Morton Horwitz presents evidence for similar developments in judicial decisions regarding riparian property rights and corporate charters. Although initially monopoly grants had been considered essential to promote economic development, "the restrictive consequences of these grants were becoming apparent by the second quarter of the nineteenth

[56] Scheiber, "Technology," contends that an enduring aspect of early patent policy in relation to the legal system was the obligation of the government to promote public welfare by preventing "unwarranted exclusiveness." However, the courts generally identified national interests with the interest of the individual inventor until the middle of the nineteenth century. Baldwin, for instance, declared in *Whitney v. Emmett*, 29 F. Cas. 1074 (1831) that "Congress have declared the intention of the law to be to promote the progress of the useful arts by the benefits granted to inventors; not by those accruing to the public, after the patent has expired, as in England." The judiciary attempted to ensure that patentees appropriated a fair return from their genius and accomplishments, and they tried to resolve conflicts among competing inventors rather than between inventors and public. As such, it is likely that patentees in the first half of the century were better able to secure greater profits from their inventions than they would have been under a system that recognized the negative externalities of monopoly grants and accordingly attempted to limit private property rights in invention.

century."[57] However, it was not until much later that patent decisions addressed the concerns of the judiciary in riparian and corporate disputes; federal courts initially argued that patents belonged to a different class of rights: rather than monopolists, patentees were "public benefactors," whose property it was the duty of the court to defend in order to promote technological change. Ultimately, the judiciary came to recognize openly that the enforcement and protection of *all* property rights involved trade-offs between individual monopoly benefits and social welfare.

CONCLUSION

The question of which institutions are appropriate for initiating and inducing economic progress is not merely of rhetorical interest today, for many modern societies are confronting the same issues that faced policymakers in the early American Republic. The framers of the U.S. Constitution attempted to create institutions that would encourage individual enterprise, in the belief that the pursuit of private returns would lead to the greatest social returns. The judiciary in this critical period comprised a select group of extraordinary individuals—including John Marshall, Roger Taney, and Joseph Story—who proceeded to formulate decisions within the ambit of the Constitution, explicitly realizing those decisions would establish the legal foundations that would influence the development of markets, corporations, inventions, and innovations. Judges recognized the importance of secure property rights in a market economy and were especially concerned about the enforcement of patents as "the dearest and most valuable" of property rights.

Some researchers contend that the early patent system was ineffectual and that property rights in patents were of nominal value. In this article I have considered one aspect of that dispute by examining the role of the courts in the patent system. Previous studies have argued that the judiciary was unfavorably disposed towards patentees and arbitrarily overturned patent rights. An examination of all 795 reported patent cases refutes this view. A study of litigation is admittedly a study in pathology and considers an atypical sample of inventions and disputes about inventions. However, patent rights are secured in the U.S. Constitution and administered at the federal level in a deliberate attempt to ensure consistency and certainty. My logit model of outcomes in patent cases indicates that decisions were indeed consistent across regions and circuits. Moreover, the results suggest that statutory changes in 1836 altered the likelihood of a decision for the patentee because of a change in the underlying population of cases brought to

[57] Horwitz, *Transformation*, p. 130.

trial. The courts acknowledged that inventive efforts varied with the extent to which inventors could appropriate the returns on their discoveries and attempted to ensure that patentees were not unjustly deprived of the benefits from their inventions.

Within this context of concern with the defense of property rights of true inventors, early courts still had to grapple with a number of difficult issues, such as the identity of the "first and true" inventor, the appropriate measure of damages, disputes between owners of conflicting patents, and how to protect the integrity of contracts when the law altered. It was initially proposed that increases in public welfare were a derivative of private initiative and enterprise: to encourage and benefit individual inventiveness thus promoted economic growth and development. The early focus on securing the rights and benefits of patentees, rather than on the social-welfare consequences of monopoly grants, enhanced the private return on patent protection.

Changes inevitably occurred when litigants and judiciary both adapted to a more complex technological and economic environment. Some might contend that the recognition in the 1850s of a trade-off between social and private benefits undermined the security of property rights in patents. Such a claim misses the most critical aspects of property rights: whether they are well defined (which requires the establishment of limits) and whether they are enforced. The two are related because an unlimited property right is inherently unenforceable. Early American legal decisions demonstrated a sophisticated grasp of these features of property rights and their role in engendering a market economy based on individual enterprise and innovation.

The evidence presented in this article suggests that property rights were enforced and fails to support the arguments of researchers who are skeptical about the efficacy of the patent system in promoting inventive activity in the early nineteenth century. This conclusion is consistent with the large numbers of patents filed per capita, the practice of inventors in submitting caveats to warn of their intent to patent, and the extensive market in the sale and licensing of patent rights. If inventive activity were indeed responsive to material incentives, then the legal system played an important part in stimulating greater technical change by reinforcing the effectiveness of the patent system. More generally, the focus on the relationship between the legal system and inventive activity in this period highlights the significance of appropriate institutions during early industrialization. Property rights in invention that were clearly defined and well enforced by the courts promoted market exchange and technological progress. A legal system that adhered to the principles of the Constitution and attempted to promote the progress of useful arts by protecting the rights of all patentees contributed significantly to the broad-based, "democratic" character of U.S. economic growth in the nineteenth century.

Appendix

The data set is the most complete collection of patent lawsuits extant for the period, and was compiled from the following sources: *The National Reporter System, Federal Cases in the Circuit and District Courts of the United States, 1789–1880*, vols. 1–31 (St. Paul, 1894); Samuel Fisher, *Fisher's Patent Cases* (Cincinnati, 1868); James Robb, *Robb's Patent Cases*, 2 vols. (Boston, 1854); *U.S. Supreme Court American and English Patent Cases*, 1754–1847, (Washington, DC, 1887–1892), vol. 4; Charles Whitman, *Whitman's Patent Cases Determined in the United States Supreme Court* (Washington, DC, 1875–1878); Elgar Simonds, *Simond's Digest of Patent Cases in the Federal and State Courts, 1789–1888* (New York, 1888); William G. Meyer, *Federal Decisions: Cases Argued and Determined in the Supreme, Circuit and District Courts of the United States* (St. Louis, 1886); and Stephen Law, *Digest of American Cases Relating to Patents for Inventions and Copyrights, Including Numerous Manuscript Cases, 1789–1862* (New York, 1877).

These lawsuits are necessarily limited to reported decisions and to the few manuscript cases available or mentioned in court citations. It is to be expected that appellate decisions were more likely to be published. Individual reporters, rather than the state systems, published most of these reports; consequently, the cases of more general interest tended to be published. Some of the cases that were privately circulated and that existed only in manuscript form were included in the legal compendia from which the sample was compiled. (In this article these unreported decisions are represented in aggregate statistics, but not in the tables that involve details about the lawsuits.)

Although the sample of lower court decisions is likely to be incomplete, in most states the law stipulated that decisions of the higher courts were to be reported, and in 1839 the *American Jurist* opined that "within the last 50 years, no country has done so much in this department of juridical literature, as the United States." The decisions of the Supreme Court itself were written since its inception by presiding justices, but variations do exist in the quantity and quality of reporting in the different circuits—ranging from exceptional in the first circuit to chaotic in the newly acquired territories. The states comprising the circuit courts (1802 to 1866) were as follows: first circuit—Maine, New Hampshire, Massachusetts, and Rhode Island; second circuit—Vermont, Connecticut, and New York; third circuit—Pennsylvania and New Jersey; fourth circuit—Delaware and Maryland; fifth circuit—Virginia and North Carolina; sixth circuit—South Carolina and Georgia; seventh circuit—Kentucky, Tennessee, and Ohio (from 1837 to 1866 the seventh circuit consisted of Ohio, Michigan, Indiana, and Illinois). The terms "plaintiff" and "patentee" are used interchangeably in the text, although they are not identical: the patentee was the defendant in 4.3 percent of the 580 cases for which information was available. The data take this into account in assessing quantitative outcomes.

The data in Table 6 comprise a sample of reported lawsuits included in the Mead Data Central, *Lexis*® Computer Database. The total number of cases in the table is 372 (59 Supreme Court cases and 313 lower court cases, which include three district court cases and 310 circuit court cases). I have omitted interference cases (which involve appeals made from the decision of the Commissioner of Patents in disputes between two inventors who both claim priority in making an invention), because the sole issue was whether a particular applicant should be given a patent—the grant of a patent in an interference process could not revoke the rights of an already granted patent—and *ex parte* appeals from decisions by the Commissioner of Patents. Plaintiffs and defendants comprised claimants to the patent property (patentee, assignee, and licensee), independent manufacturers (businesses without any legal claims to use the patent), and unknown (others who were not specified in the lawsuit). The issue of the lawsuit is

categorized as infringement, injunctions in courts of equity, conflicts about damages, costs, and expenses, questions about the appropriate jurisdiction of the court, procedural issues (such as whether a witness is to be allowed to give evidence), contractual disputes (for example, whether a licensee is violating a contract by selling in a particular location), and other (mainly motions for a new trial based on questions such as an alleged error in the judge's summary instructions). Decisions about the validity of the patent include: the patent was held void (indicating that the plaintiff could not bring a charge *in the specific case being decided*, based on the patent); the patent right was upheld; cases where the validity of the patent was not contested (such as a lawsuit where the alleged infringer acknowledged that the plaintiff's patent was valid, but claimed that his machine did not infringe because it was substantially different); and cases where no decision was reached about the validity of the patent (an example being an outcome where the case was remanded to another court or the decision was not mentioned in the report). It should be noted that a decision recorded as a "win" for either party did not necessarily indicate that the opponent in the lawsuit "lost"; that depends on the issue of the lawsuit: an example is where a new trial is ordered. In addition to the above, decisions went in favor of defendants if they were found to use inventions that did not infringe the plaintiff's patent, if the plaintiff lacked the legal title to the patent (such as an assignee who had violated the contract of assignment with the patentee), or if there was an inadequate basis for the claims of the plaintiff. See the text for a discussion of the grounds on which the validity of the patent was challenged. The "grounds" variable combines circuit court and supreme court disputes.

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