

Strategy and Abuse in Massive Patent Assertions at the Extremes of Patent Litigation

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Abstract

This article examines high-volume patent litigation by patent owners asserting a few patents in extremely large numbers of cases. Using data on millions of patents and related patent litigation, the study evaluates two types of distinctive high-volume litigation behaviors.

The first involves large-scale litigation of patents that are specially crafted in extended patent application proceedings. These extended proceedings allow patent applicants to learn about infringing actions of potential litigation targets and to match patent terms to those infringing activities. Large-scale patent litigation based on patents crafted in this way constitutes the end game in liability maximizing processes stretching back to earlier points when patents were tailored to be effective in litigation. The litigants involved are highly specialized and sophisticated not only in how they conduct patent litigation but also in the preliminaries of patent tailoring that set up favorable patent litigation opportunities. These aggressive patent litigators utilize opportunities within the patent system twice over—once in seeking patent contents that are particularly favorable in litigation and again in pressing many cases in parallel

based on the well-crafted patents they obtain.

A second group of patent owners initiating high-volume patent litigation appear to pursue more abusive patent cases. Significant numbers of patents asserted by these owners in large numbers of cases—sometimes in hundreds of cases per patent—are later abandoned as worthless (because the owners refuse to pay modest maintenance fees needed to keep the patents in force for their full potential terms). Thousands of patent cases have been based on ultimately abandoned patents.

The present study evaluates 2,805,982 United States utility patents issued between 1985 and 2007 and related litigation. This research is made possible by a recently compiled database describing over 55,000 patent cases filed from 2003 to 2016. Data on the patents asserted in these cases was matched with further data on patent maintenance fee payments revealing patent owners' assessments of patent value. Patent maintenance fees needed to keep patents in force are modest in comparison with the potential value of the patents affected if successfully asserted in litigation or otherwise utilized (through licensing or sales of patented products) to produce patent-enhanced profits. Patent owners' refusal to pay maintenance fees—and the consequent early lapsing of patent rights—is a signal that the owners felt their lapsed patents were essentially worthless in litigation and commercial contexts.

Large-scale litigation based on ultimately abandoned patents is the exception, not the rule. Most litigated patents are valued by their owners (as evidenced by full payment of related maintenance fees). Approximately 80 percent of the litigated patents evaluated in this study (corresponding to approximately 78 percent of patent assertions in federal cases) were extended to their full terms via payment of all required maintenance fees. Most patents deemed worthless and cast aside through non-payment of maintenance fees are also excluded from litigation. The patent maintenance fee system imposed in the United States in 1981 prompts useful valuation assessments that filter out many worthless patents from patent enforcement generally and patent litigation in particular.

However, a few extensively litigated but ultimately abandoned patents—including many patents in the top one percent most litigated patents, each asserted in 26 cases or more—account for enormous numbers of patent cases. Of the 295 patents in this top one percent (asserted in a total of 15,872 patent cases), 28 patents (or about 10 percent) were allowed to expire before the end of their full terms due to non-payment of maintenance fees. These abandoned patents—apparently accepted as worthless by their owners—were nonetheless asserted in 2,098 patent cases. The most frequently litigated among the abandoned patents was pressed in 470 cases. This type of high-volume litigation based on patents of dubious value (suspect even in the eyes of the patents' owners) deserves careful reassessment and reform to prevent further unwarranted commercial intimidation and wasted judicial resources in suits asserting worthless patents.

I. The Patent Litigation Explosion

A. Data Examined

The present study examined litigation concerning 2,805,982 United States utility patents issued between 1985 and 2007. Information on the features of these patents and the inventors producing them was linked to further data on patent litigation and early patent expirations due to failures to pay required maintenance fees. This subsection describes the data used in the study.

1. Patent Data

Data on patent features and inventors (including the technologies involved and the geographic sources of patented inventions) was obtained from PatentsView bulk data postings accessed through Google Big Query and Tableau software. PatentsView is a patent data project supported by the Office of Chief Economist of the United States Patent and Trademark Office (USPTO).¹ Bulk patent data generated by the USPTO and accumulated and analyzed by the PatentsView staff is periodically posted in publicly available datafiles accessible with the data retrieval and analysis capabilities of Google BigQuery.² Use of this data via BigQuery is simplified by features of Tableau software that directly manage and manipulate BigQuery commands and data retrieval.³

PatentsView datafiles used in this study contained information on United States utility patents issued from January 6, 1976 to July 30, 2019. For reasons explained below, not all of these patents were relevant to the present study. The study only considered utility patents issued from 1985 to 2007 for the following reasons.

Patents issued before 1985 were excluded due to the lack of related maintenance fee payment data reflecting patent owners' valuation assessments. Maintenance fee payments were only first required for patents resulting from applications submitted on or after December 12, 1980.⁴ Hence, patents issued before that date and additional patents issued later based on applications submitted before that date do not have associated maintenance fee payment data. An analysis of patents issued in the ten years after the institution of maintenance fee requirements late in 1980 showed the following percentages of patents subject to these requirements (and for which related maintenance-fee payment information was available):

¹ See About PatentsView, <https://patentsview.org/what-is-patentsview/>.

² See, e.g., Otto Stegmaier, *Measuring patent claim breadth using Google Patents Public Datasets*, GOOGLE CLOUD (July 10, 2018), <https://cloud.google.com/blog/products/ai-machine-learning/measuring-patent-claim-breadth-using-google-patents-public-datasets> (last visited on Aug. 3, 2021); *Patent analysis using Google Public Datasets on BigQuery*, <https://github.com/google/patents-public-data> (Aug. 24, 2019) (last visited on Aug. 3, 2020).

³ See *Google BigQuery and Tableau: Best Practices*, TABLEAU, <https://www.tableau.com/learn/whitepapers/google-bigquery-tableau-best-practices> (last visited 11/1/2020).

⁴ United States Patent and Trademark Office, *Maintain your patent*, USPTO.GOV (Mar. 5, 2020), <https://www.uspto.gov/patents-maintaining-patent/maintain-your-patent> (last visited on Aug. 3, 2021).

Figure 1
Percentages of Patents Subject to Maintenance Fee Requirements
by Year of Issue (1981 – 1990)

Year of Issue	Total Number	Number Fees Due	Percent
1981	65771	0	0.00%
1982	57888	135	0.23%
1983	56860	10147	17.85%
1984	67200	46691	69.48%
1985	71661	67708	94.48%
1986	70860	69602	98.22%
1987	82952	82069	98.94%
1988	77924	77563	99.54%
1989	95537	95335	99.79%
1990	90365	90193	99.81%

Because the fractions of patents subject to maintenance fee requirements were low prior to 1985, patents issued in earlier years were excluded from the study due to the lack of consistent maintenance-fee payment data.⁵

Patents issued after 2007 were excluded due to the lack of complete maintenance-fee payment histories. The last maintenance fees for patents issued in 2007—fees due 12 years after the issuance of these patents—were due in 2019. Complete records on the payment of these fees (or the lack of such payment) were available for patents issued in 2007 and earlier⁶ but not for all patents issued in later years (the maintenance fee data used in the study being gathered in mid-2020).⁷ For this reason, patents issued after 2007 were also excluded from the study.

⁵ A few patents issued in 1985 and subsequent years still fell outside the maintenance fee system and lacked fee payment data. The fraction of patents lacking this data was small (only 6.52 percent of patents issued in 1985 and far fewer in later years). The few patents issued in 1985, or after, and extended to full term because they were not subject to maintenance fee requirements were treated as full term patents for purposes of this study.

⁶ While the full term of the relevant patents may not have run out when this study was performed in 2020, patents for which the full maintenance fees had been paid as of the end of 2019 to allow those patents to extend for their full terms were deemed full term patents. For example, a patent issued in 2007 based on an application submitted in 2004 would, if all maintenance fees were paid as of 2019, be expected to continue in force until sometime in 2024 (20 years after the application date in 2004). This patent was treated as a full-term patent for purposes of this study even though the actual full term had not run out.

⁷ Patents issued in 2008 were excluded from the study because maintenance fee payment information was only available for a fraction of the patents issued in that year (that is, for only for patents issued 12 years prior to the October 19, 2020 cutoff date for maintenance fee payment data considered in the study).

2. *Litigation Data*

Patents issued from 1985 to 2007 were matched with patent litigation data generated by David L. Schwartz, Ted Sichelman, and Richard Miller.⁸ This litigation data includes case information for all patent cases filed between January 1, 2003, and December 31, 2016. The data covers the type of patent involved in each case, the type of case (e.g. infringement action, declaratory judgement action, etc.), the case filing date, and the court location of the case. Only information from this dataset on litigation involving utility patents was used in the present study.

The dataset indicates that many patents are asserted in multiple cases. According to Schwartz, Sichelman, and Miller, “60 percent of all unique utility patents in our data were involved in only one case, while 25 percent were involved in two or three cases and nearly 15 percent were involved in four or more cases during the time-period between 2003 and 2016.”⁹ Because of the frequency of multiple assertions of particular patents, the number of patent-case pairs reflected in the litigation data differed markedly from the number of unique patents recorded. The litigation dataset included 120,841 case-patent observations based on 45,596 unique patents litigated between 2003 and 2016.¹⁰

3. *Expiration Data*

Information on patent expirations was taken from United States Patent and Trademark Office (USPTO) records on patent maintenance fee payments.¹¹ For United States utility patents based on applications filed on or after December 12, 1980, maintenance fees are due at 4, 8, and 12 years after patent issuance.¹² The failure to pay one of these fees causes the related patent to lapse.¹³ The maintenance fee amounts needed to keep patents in force go up with successive fee due dates, but all of the relevant fees are relatively modest.¹⁴

Data on maintenance fee payments (and the corresponding early expiration of patents for lack of fee payments) is maintained by the USPTO.¹⁵ The resulting dataset

⁸ See generally David L. Schwartz, Ted Sichelman & Richard Miller, *USPTO Patent Number and Case Code File Dataset Documentation* (USPTO Econ. Working Paper, Paper No. 2019-05, 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3507607&download=yes.

⁹ *Id.* at 6.

¹⁰ *Id.*

¹¹ See *Patent maintenance fee events (SEP 1, 1981–present)*, *USPTO Datasets* (Dec. 23, 2021), <https://developer.uspto.gov/product/patent-maintenance-fee-events-and-description-files>.

¹² See 35 U.S.C § 41(b)(1)–(2).

¹³ *Id.*

¹⁴ Required patent maintenance fees vary with both the number of years from patent issuance and the size of the entity owning a patent. The biggest fees apply to large organizational patent owners—that is, organizations with at least 500 employees. For such entities, the maintenance fees are: \$1600.00 due at 4 years after patent issuance, \$3600.00 due at 8 years, and \$7400.00 due at 12 years. The amounts due from patent owners that are smaller organizations or individuals are less at every maintenance fee due date. See United States Patent and Trademark Office, *Patent Maintenance Fees*, USPTO.Gov, <https://www.uspto.gov/learning-and-resources/fees-and-payment/uspto-fee-schedule#Patent%20Maintenance%20Fee>.

¹⁵ See *Patent maintenance fee events (SEP 1, 1981–present)*, *supra* note 11.

records maintenance fee payment events for patents granted from September 1, 1981, to present. The version of the dataset used in the present study recorded maintenance fee events (including patent expirations due to non-payment of maintenance fees) through October 19, 2020.

Using dates of patent expiration in the USPTO data and dates of issuance from the PatentsView data, it was possible to identify subgroups of patents that expired due to non-payment of maintenance fees at 4, 8 and 12 years after patent issuance. Using this information, all of the patents in the present study were grouped into four categories: 1) patents expiring four years after issuance due to non-payment of maintenance fees, 2) patents expiring eight years after issuance due to non-payment of maintenance fees, 3) patents expiring twelve years after issuance due to non-payment of maintenance fees, and 4) patents extended to full term via payment of all relevant maintenance fees.

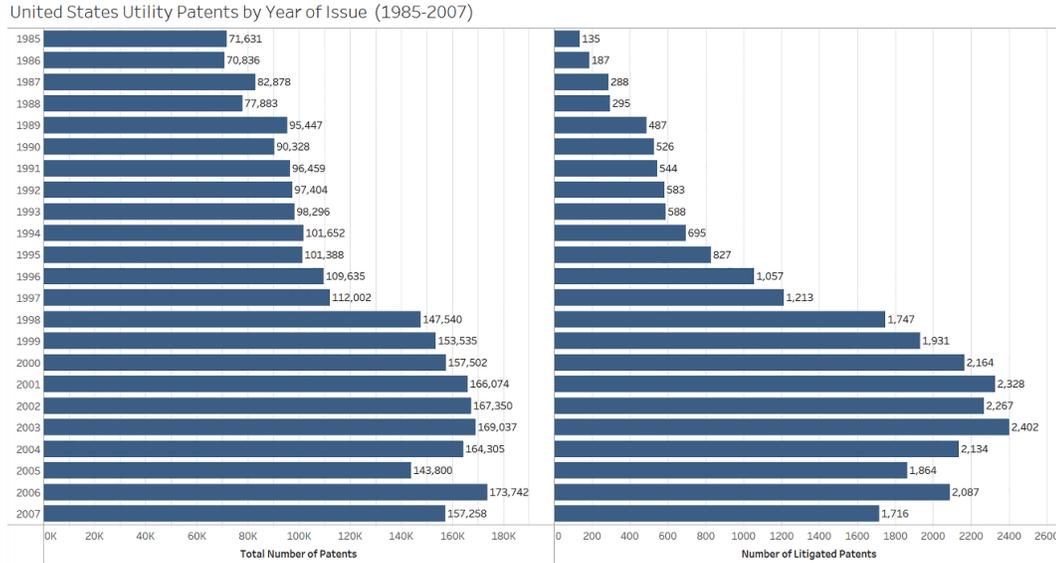
B. Increases in Litigation Over Time

The data examined in this study confirms a significant rise in patent litigation in recent years. The rise is reflected in increasing numbers of patents litigated, fractions of all patents litigated, total numbers of patent litigation cases, and cases per patent.

1. Numbers of Patents Litigated by Year of Issue

The following figure summarizes the changes in numbers of patents and patents litigated over the period of the study.

Figure 2
Patents and Litigated Patents by Year of Issue

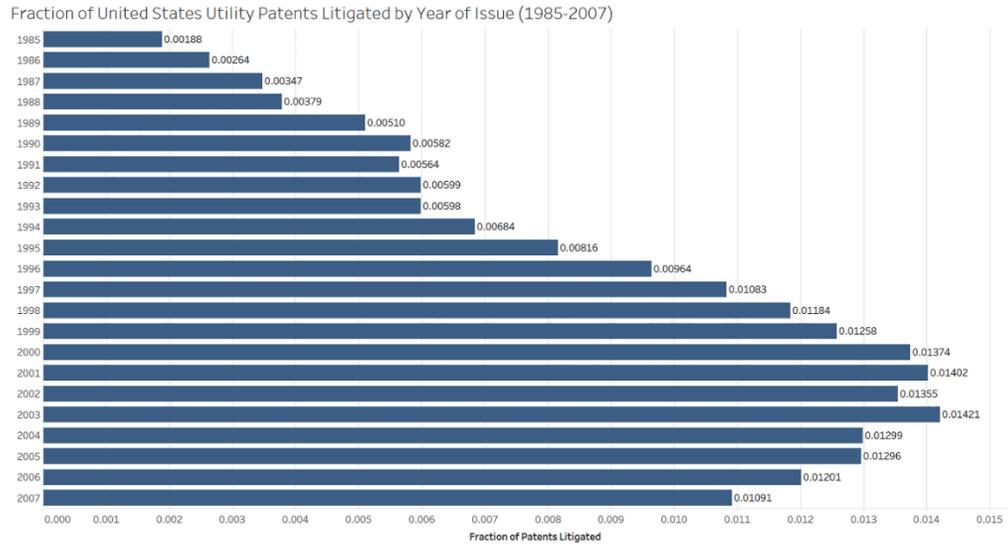


The general pattern of increases in numbers of litigated patents only fell off after 2004. However, the drop shown in this figure for years after 2004 may be merely a statistical artifact. Litigation figures for later years are artificially truncated because they do not capture potential litigation over the full life of the patents involved. Some of the patents issued in the indicated years were still in force for a number of years after the cutoff date for the litigation data used in this study. The data considered here captures patent cases filed through 2016. Patents with first cases filed after this date are not reflected in the litigated patent counts. For this reason, the litigated patent counts for the later years reflected in the above figure are probably underestimates of the actual number of litigated patents.

2. *Fractions of All Patents Litigated by Year of Issue*

Some increases in numbers of patents litigated may follow from increases in numbers of patents issued year to year. To test whether the prevalence of litigated patents changed independent of shifts in the volumes of issued patents, the fractions of patents litigated for each year of issued patents was calculated. The following figure summarizes the changes in these fractions.

Figure 3
Fractions of Patents Litigated by Year of Issue



As before, the drops in fractions of patents litigated for years after 2004 may reflect truncation effects.

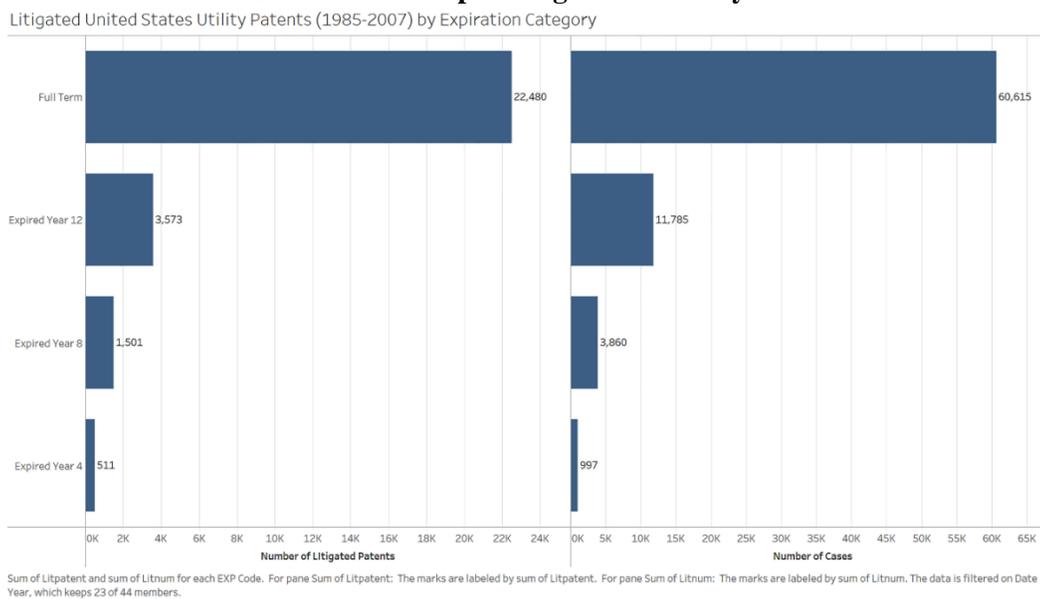
These values confirm that increasing percentages of patents were litigated over the years of the study. Indeed, the changes in these fractions were quite large, reflecting a significantly higher likelihood of litigation in the later years covered by the study. A patent issued in 2001 was over seven times more likely to be involved in litigation than a patent issued in 1985.¹⁶

3. Total Patent Cases and Cases per Patent by Year of Issue

Patent case counts increased even more extensively across the years covered by the study. As noted earlier, some litigated patents are asserted in multiple cases (indeed, in a few instances, are asserted in several hundred cases), meaning that case counts can divert materially from numbers of litigated patents. The changes in patent case numbers and average cases per litigated patent over the years of the study are summarized in the following figure.

¹⁶ This follows from the fractions of litigated patents for patents issued in 1985 and 2001. The increase in the likelihood of involvement in litigation is equal to the ratio of these fractions or $.01402/.00188 = 7.45745$.

Figure 4
Total Patent Cases and Cases per Litigated Patent by Year of Issue



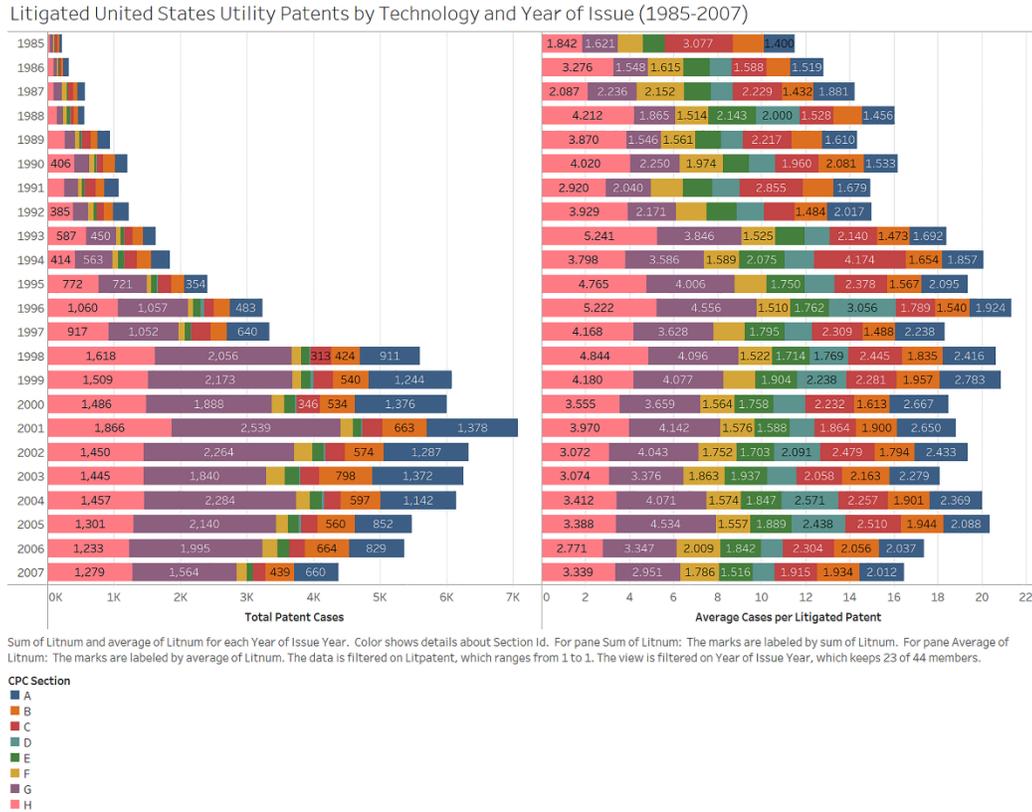
This figure confirms that changes in the number of patent cases over the period of the study was due to the cumulative impact of two factors: first, because of increases in the numbers of patents litigated and, second, because of changes in the average numbers of cases involving each litigated patent. The number of cases per patent rose steadily through patents issued in 1998 and then stayed relatively stable for later patents. This suggests that reasons behind multiple assertions of particular patents evolved through about 1999 but have remained more stable in recent years.

C. Technologies Affected

Patent litigation patterns also varied by technology types. The following figure summarizes the numbers of patent cases and cases per patent for different technologies over the period of the study. Each colored bar segment corresponds to one CPC technology classification section. The case counts and average cases per patent in each bar segments are values for advances in the corresponding CPC section.¹⁷

¹⁷ The colors in this figure correspond to technology categories within the Cooperative Patent Classification (CPC) system used by the USPTO and the patent offices of many other countries to characterize the technologies covered by patents. See United States Patent and Trademark Office, *Patent Classification*, USPTO.Gov, <https://www.uspto.gov/patents-application-process/patent-search/classification-standards-and-development>. The CPC sections reflected in the figure represent the broadest technology categories in the CPC system. The indicated CPC sections include the following technologies: A—Human Necessities; B—Performing Operations & Transporting; C—Chemistry & Metallurgy; D—Textiles & Paper; E—Fixed Constructions; F—Mechanical Engineering, Lighting, Heating, Weapons & Blasting; G—Physics; and H—Electricity. See United States Patent and Trademark Office, *Classification Resources*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc.html>.

Figure 5
Patent Cases and Cases per Litigated Patent
by Technology Type and Year of Issue



This figure documents recent increases in patent litigation for computer-related technologies (mostly included in CPC sections G and H) and medical technologies (mostly included in CPC section A). Total cases increased substantially concerning these technologies over the period of the study. Cases per patent also increased for these technologies, in contrast to the cases-per-patent values for other technologies which were relatively similar across the period of the study.

D. Concentration of High-Volume Litigation

High-volume patent litigation—measured in terms of cases per patent—derived mainly from a very few heavily litigated patents. Most litigated patents were asserted in only one case. Over 95 percent of all litigated patents were asserted in eight or fewer cases. At the high end of mass-scale litigation, a few patents were litigated in hundreds of cases. The following figure summarizes the distribution of cases per patent among litigated patents (including all litigated patents issued between 1985 and 2007).

Figure 6
Distribution of Cases per Litigated Patent (1985–2007)

Cases per Patent	Numbers of Patents	Percent	Cum. Percent	Cases per Patent	Numbers of Patents	Percent	Cum. Percent	Cases per Patent	Numbers of Patents	Percent	Cum. Percent
1	16,809	59.89	59.89	31	8	0.03	99.24	61	2	0.01	99.71
2	5,034	17.94	77.83	32	9	0.03	99.27	62	2	0.01	99.71
3	2,246	8.00	85.83	33	14	0.05	99.32	63	7	0.02	99.74
4	1,002	3.57	89.40	34	7	0.02	99.35	64	1	0.00	99.74
5	643	2.29	91.69	35	3	0.01	99.36	65	4	0.01	99.76
6	434	1.55	93.24	36	5	0.02	99.38	66	4	0.01	99.77
7	352	1.25	94.49	37	6	0.02	99.40	69	3	0.01	99.78
8	228	0.81	95.31	38	6	0.02	99.42	70	3	0.01	99.79
9	193	0.69	96.00	39	6	0.02	99.44	71	1	0.00	99.80
10	157	0.56	96.55	40	3	0.01	99.45	72	1	0.00	99.80
11	108	0.38	96.94	41	4	0.01	99.47	73	3	0.01	99.81
12	99	0.35	97.29	42	6	0.02	99.49	74	3	0.01	99.82
13	71	0.25	97.54	43	7	0.02	99.51	77	1	0.00	99.83
14	50	0.18	97.72	44	5	0.02	99.53	78	1	0.00	99.83
15	60	0.21	97.94	45	7	0.02	99.55	79	2	0.01	99.84
16	53	0.19	98.13	46	2	0.01	99.56	80	1	0.00	99.84
17	48	0.17	98.30	47	3	0.01	99.57	81	6	0.02	99.86
18	29	0.10	98.40	48	2	0.01	99.58	82	4	0.01	99.88
19	31	0.11	98.51	49	2	0.01	99.59	83	2	0.01	99.88
20	35	0.12	98.64	50	5	0.02	99.60	85 or more	33	0.12	100.00
21	32	0.11	98.75	51	2	0.01	99.61				
22	22	0.08	98.83	52	3	0.01	99.62	Total	28,065	100.00	
23	8	0.03	98.86	53	6	0.02	99.64				
24	16	0.06	98.91	54	5	0.02	99.66				
25	10	0.04	98.95	55	3	0.01	99.67				
26	22	0.08	99.03	56	1	0.00	99.68				
27	20	0.07	99.10	57	1	0.00	99.68				
28	10	0.04	99.13	59	4	0.01	99.69				
29	9	0.03	99.17	60	2	0.01	99.70				
30	13	0.05	99.21								

Because a few patents at the high end of this distribution were litigated very frequently, the distribution of total assertions of litigated patents reflects a particular emphasis on highly litigated patents.¹⁸ The following figure summarizes this distribution.¹⁹

Figure 7

¹⁸ Case assertions include every time a patent is at issue in a case. Total assertions for all patents at specific cases per patent levels equal the number of patents at that level times the cases per patent for that level. For example, if 10 patents were each litigated in 20 cases per patent the total number of patent assertions would be $10 \times 20 = 200$. Total assertions correspond to the number of times patent rights were contested and potentially enforced in litigation, thereby painting a picture of the aggregate litigation impacts involved. Furthermore, since they track the number of contests over particular patents in litigation, aggregate assertion figures provide insights into the varying litigation costs associated with litigating particular patents.

¹⁹ This distribution focuses on numbers of assertions in patent cases rather than the total number of cases involving the various patents addressed. Since some patents in the analysis were asserted in the same cases as other patents, an analysis of total cases in which these patents appeared risks double counting cases where two or more patents were asserted. The evaluation of patent assertions in this table evaluates the number of times rights derived from each patent figured in litigation and had potential impacts on defendants involved in that litigation.

Distribution of Total Assertions per Litigated Patent (1985–2007)

Cases per Patent	Numbers of Patents	Total Assertions	Percent Total Assertions	Cum. Percent Total Assertions	Cases per Patent	Numbers of Patents	Total Assertions	Percent Total Assertions	Cum. Percent Total Assertions	Cases per Patent	Numbers of Patents	Total Assertions	Percent Total Assertions	Cum. Percent Total Assertions
1	16,809	16,809	21.76	21.76	31	8	248	0.32	82.42	61	2	122	0.16	89.68
2	5,034	10,068	13.03	34.79	32	9	288	0.37	82.80	62	2	124	0.16	89.84
3	2,246	6,738	8.72	43.51	33	14	462	0.60	83.39	63	7	441	0.57	90.41
4	1,002	4,008	5.19	48.70	34	7	238	0.31	83.70	64	1	64	0.08	90.50
5	643	3,215	4.16	52.86	35	3	105	0.14	83.84	65	4	260	0.34	90.83
6	434	2,604	3.37	56.23	36	5	180	0.23	84.07	66	4	264	0.34	91.18
7	352	2,464	3.19	59.42	37	6	222	0.29	84.36	69	3	207	0.27	91.44
8	228	1,824	2.36	61.78	38	6	228	0.30	84.65	70	3	210	0.27	91.71
9	193	1,737	2.25	64.03	39	6	234	0.30	84.96	71	1	71	0.09	91.81
10	157	1,570	2.03	66.06	40	3	120	0.16	85.11	72	1	72	0.09	91.90
11	108	1,188	1.54	67.60	41	4	164	0.21	85.32	73	3	219	0.28	92.18
12	99	1,188	1.54	69.14	42	6	252	0.33	85.65	74	3	222	0.29	92.47
13	71	923	1.19	70.33	43	7	301	0.39	86.04	77	1	77	0.10	92.57
14	50	700	0.91	71.24	44	5	220	0.28	86.33	78	1	78	0.10	92.67
15	60	900	1.16	72.41	45	7	315	0.41	86.73	79	2	158	0.20	92.88
16	53	848	1.10	73.50	46	2	92	0.12	86.85	80	1	80	0.10	92.98
17	48	816	1.06	74.56	47	3	141	0.18	87.03	81	6	486	0.63	93.61
18	29	522	0.68	75.23	48	2	96	0.12	87.16	82	4	328	0.42	94.03
19	31	589	0.76	76.00	49	2	98	0.13	87.29	83	2	166	0.21	94.25
20	35	700	0.91	76.90	50	5	250	0.32	87.61	85 or more	33	4446	5.75	100.00
21	32	672	0.87	77.77	51	2	102	0.13	87.74					
22	22	484	0.63	78.40	52	3	156	0.20	87.94	Total	28,065	77,257	100.00	
23	8	184	0.24	78.64	53	6	318	0.41	88.35					
24	16	384	0.50	79.13	54	5	270	0.35	88.70					
25	10	250	0.32	79.46	55	3	165	0.21	88.92					
26	22	572	0.74	80.20	56	1	56	0.07	88.99					
27	20	540	0.70	80.90	57	1	57	0.07	89.06					
28	10	280	0.36	81.26	59	4	236	0.31	89.37					
29	9	261	0.34	81.60	60	2	120	0.16	89.52					
30	13	390	0.50	82.10										

Thus, while patents litigated once accounted for about 60 percent of all litigated patents, they accounted for only about 22 percent of total patent assertions in litigation. Patents asserted 8 or fewer times, while representing over 95 percent of all litigated patents, only figured in about 62 percent of patent assertions. At the opposite extreme, the top one percent of litigated patents (corresponding to patents litigated in 26 cases or more) accounted for about 20 percent of assertions. Patents litigated extremely frequently, in 85 cases or more, represented only about .12 percent of litigated patents but produced about 5.76 percent of patent assertions. These percentages confirm that heavily litigated patents loom much larger in litigation assertions and impacts than the numbers of such patents would indicate. A relatively few patents, amplified in influence via assertions in very large numbers of cases, have the potential for vast impacts on numerous defendants.

II. Variations in Patent Litigation Across Differences in Perceived Patent Value

A. Differing Litigation Patterns for High and Low Value Patents

Patent litigation decisions vary for high- and low-value patents (as assessed by their owners and reflected in patent maintenance-fee payments).²⁰ Patents perceived

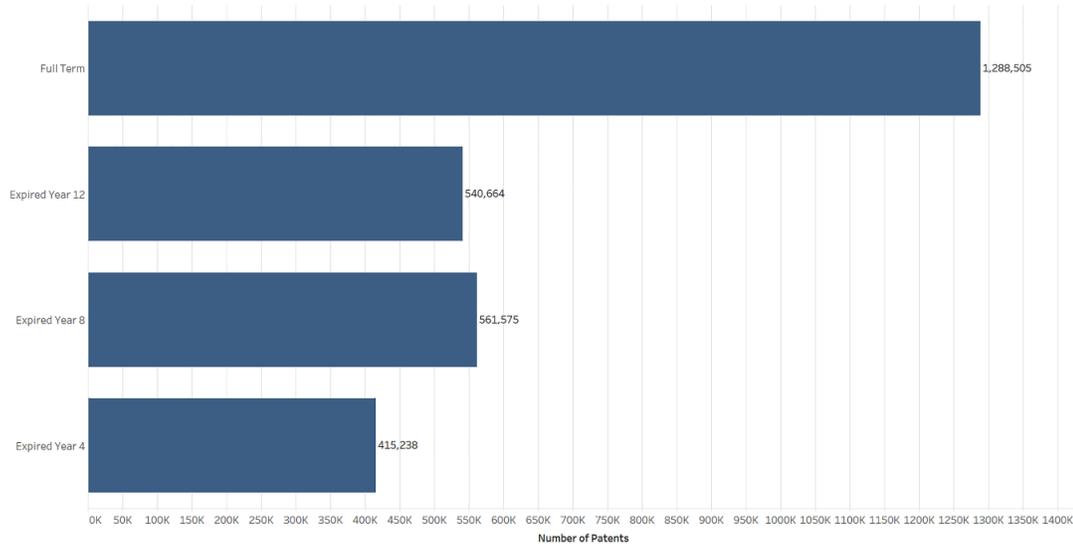
²⁰ Maintenance fee payments have been used by a number of researchers as proxies for private patent value. See, e.g., Deepak Hegde & Bhaven Sampat, *Examiner citations, applicant citations, and the private value of patents*, 105 ECON. LETTERS 287, 287–89 (2009); Jean O. Lanjouw, Ariel Pakes & Jonathan Putnam, *How to count patents and value intellectual property: uses of patent renewal and application data* (Nat'l Bureau of Econ. Rsch., Working Paper No. W5741, 1996). These payments are used here to assess how litigation decisions have varied across patents with different perceived

by owners as having substantial value when maintenance fees are due (four, eight, and twelve years after patent issuance) are kept in force with payments; patents seen as having little value are allowed to lapse via non-payment of required fees.

To examine litigation decisions for patents with different perceived values, the patents examined in the study were divided into four expiration categories: 1) patents lapsing four years after issuance due to failures to pay maintenance fees due at that point; 2) patents lapsing eight years after issuance due to maintenance fee non-payment; 3) patents lapsing twelve years after issuance due to maintenance fee non-payment; and 4) patents extended to full term (based on payment of all required maintenance fees). The breakdown of the patents in the study in terms of these four categories was as follows.

Figure 8
Patents by Expiration Category

All United States Utility Patents (1985-2007) by Expiration Category

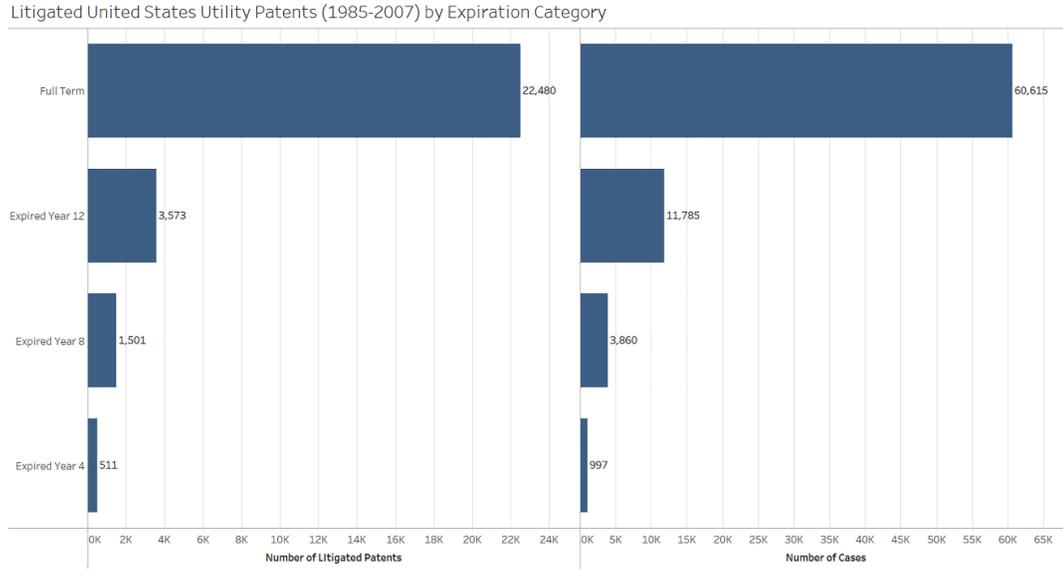


Sum of Number of Records for each EXP Code. The marks are labeled by sum of Number of Records. The data is filtered on Date Year, which keeps 23 of 44 members.

Overall, patents extended to full terms constituted approximately 45.92 percent of the patents in the study, whereas the remaining 54.08 percent expired at various early points within their potential terms.

Litigated patents, by contrast, were almost all highly valued patents saved from early expiration by full maintenance fee payments. The following two figures summarize the breakdowns of all patents, litigated patents, and affected patent cases by patent expiration category. The figures for patent cases reflect the number of instances in which litigated patents were asserted in patent cases (meaning, for example, that a given case was counted twice if two different patents were asserted in that case).

Figure 9
Litigated Patents and Patent Cases by Expiration Category



Sum of Litpatent and sum of Litnum for each EXP Code. For pane Sum of Litpatent: The marks are labeled by sum of Litpatent. For pane Sum of Litnum: The marks are labeled by sum of Litnum. The data is filtered on Date Year, which keeps 23 of 44 members.

Figure 10
Litigation Percentages by Expiration Category

	All Patents		Litigated Patents	
	Patents	Cases	Patents	Cases
Full Term	45.92%	78.46%	80.10%	78.46%
Expired Year 12	19.27%	15.25%	12.73%	15.25%
Expired Year 8	20.01%	5.00%	5.35%	5.00%
Expired Year 4	14.80%	1.29%	1.82%	1.29%
Total	100.00%	100.00%	100.00%	100.00%

A useful way to interpret these figures is to note that only about 23 percent of patent cases (100.00% - 78.46% = 22.54%) reflect litigation based on patents of uncertain value—that is, patents expiring early and potentially allowed to expire because their owners felt the patents had no value.²¹

²¹ Not all of the early expiring patents relied on in litigation may have been viewed as worthless by their owners. Some may have expired early because of “terminal disclaimers” under which patent holders, in their patent applications, agree to give up and disclaim some period of patent enforce in the terminal or end portion of what would be a normal patent term. Terminal disclaimers are used where a patent applicant relies on application procedures that allow two or more patents to issue based on a single patent application. Such procedures raise the potential of two or more patents with different durations covering different features of a single invention. To avoid having the later-issued patents extend the term of patent protection beyond the period when the first-issued patent would be

Focusing on the likelihood of litigation based on a given patent, valued patents extended to full term were much more likely to be litigated than other patents. The relevant breakdown was as follows.²²

Figure 11
Likelihood of Litigation by Expiration Category

	All Patents	Litigated Patents	Likelihood of Litigation
Full Term	1,288,505	22,480	0.0174
Expired Year 12	540,664	3,573	0.0066
Expired Year 8	561,575	1,501	0.0027
Expired Year 4	415,238	511	0.0012
All Expired	1,517,477	5,585	0.0037
Total	2,805,982	28,065	0.0100

Patents deemed valuable by their owners (corresponding to patents extended to full term) were litigated at a rate almost 5 times higher than patents of uncertain value allowed to expire by their owners due to non-payment of maintenance fees.²³

B. Increased Assertions of Early Expiring Patents at High Litigation Volumes

The positive correlation between full term patents and patent litigation likelihoods holds firm across most litigation levels but breaks down somewhat for the most heavily litigated patents. A higher percentage of early expiring patents are litigated in high-volume patent litigation (with many cases filed per patent) than in low-volume litigation.

To assess the consistency of litigation patterns across litigation volume levels,

enforceable, an applicant can only gain a second or additional patent in these circumstances by agreeing to limit the additional patent's term to the duration of the first-issued patent. *See* United States Patent and Trademark Office, Manual of Patent Examining Procedure ("MPEP") § 2701(V), <https://www.uspto.gov/web/offices/pac/mpep/s2701.html>; N. Scott Pierce, *Inventorship, Double Patenting, and the America Invents Act*, 30 BERKELEY TECH. L. J. 1613, 1653–56 (2015). Agreement to a terminal disclaimer that gives up some of the terminal or ending duration of normal patent enforceability will artificially limit the duration of patent rights. Patents subject to terminal disclaimers may be allowed to expire through non-payment of fees not because owners do not value the remaining term of enforceability that payments would normally preserve but rather because there is little or no potential remaining term of enforceability available because patent rights for the additional period were given up via a terminal disclaimer. The impacts of terminal disclaimers on high-volume patent litigation is examined in more depth at a later point in this article.

²² The likelihood that a patent was litigated was determined by dividing the number of litigated patents by the total number of patents for each patent expiration category.

²³ The litigation rates for these two types of patents were .0174 and .0037 respectively, leading to a comparison of $.0174/.0037 = 4.70$ or 470 percent. This indicates that the rate for full term patents was just under five times the rate for expired patents.

litigated patents were divided into three groups: 1) litigated patents in the bottom 94 percentiles of least frequently litigated patents (a group encompassing patents asserted in 1 to 8 cases), 2) litigated patents in the next 95th to 99th percentiles of litigated patents (corresponding to patents asserted 9 to 25 times), and 3) litigated patents in the top 1 percent of most litigated patents (corresponding to patents litigated in 26 cases or more). The patents and cases per patent in these three categories were evaluated by expiration category, with the following results.

Figure 12

Litigation Breakdowns by Assertion Volume and Expiration Category

	All Patents	All Litigated Patents		Bottom 94%		Top 95-99%		Top 1%	
	Patents	Patents	Cases	Patents	Cases	Patents	Cases	Patents	Cases
Full Term	1,288,505	22,480	60,615	21,421	38,727	837	11,148	222	10,740
Expired Year 12	540,664	3,573	11,785	3,381	6,129	141	1,935	51	3,721
Expired Year 8	561,575	1,501	3,860	1,444	2,200	39	504	18	1,156
Expired Year 4	415,238	511	997	502	674	5	68	4	255
Total	2,805,982	28,065	77,257	26,748	47,730	1,022	13,655	295	15,872
	All Patents	All Litigated Patents		Bottom 94%		Top 95-99%		Top 1%	
	% Patents	% Patents	% Cases	% Patents	% Cases	% Patents	% Cases	% Patents	% Cases
Full Term	45.92%	80.10%	78.46%	80.08%	81.14%	81.90%	81.64%	75.25%	67.67%
Expired Year 12	19.27%	12.73%	15.25%	12.64%	12.84%	13.80%	14.17%	17.29%	23.44%
Expired Year 8	20.01%	5.35%	5.00%	5.40%	4.61%	3.82%	3.69%	6.10%	7.28%
Expired Year 4	14.80%	1.82%	1.29%	1.88%	1.41%	0.49%	0.50%	1.36%	1.61%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Litigation patterns for patents in the bottom 94 percent of litigated patents and patents in the 95th to 99th percentiles reflect generally consistent variations of patent valuation assessments and litigation decisions. Highly valued patents (those extended to full terms) represented about 80 percent of all litigated patents; only about 20 percent of litigated patents expired early (reflecting possible concerns by owners about the value of the patents). Only among the top one percent of litigated patents (reflecting patents asserted in 26 or more cases) were substantially higher percentages of early expiring patents pressed in litigation. Among these most heavily asserted patents, almost a third of the litigated patents expired before their full term.

These breakdowns reveal two features of high-volume patent litigation. First, a few patents in the top one percent of most litigated patents account for a remarkably high percentage of all patent litigation. Although constituting only about one percent of the 28,065 litigated patents considered in the study (and .01 percent of the full 2,805,982 patents issued in the relevant time frame), the 295 litigated patents in the top one percent figured in 15,872 cases or about 20 percent of the 77,257 patent cases in the study. These 295 patents were litigated in an average of about 54 cases per patent. Because they each figured in many patent cases, these heavily litigated patents (and the litigation decisions that amplified their impacts in patent litigation) deserve more attention than their small numbers would suggest. The thousands of cases based on these patents point to their major importance for patent litigation and the patent system. Litigation concerning these few patents deserves close attention and possible

reform.

Second, the large percentage of early expiring patents figuring in high-volume patent litigation is troubling. Decisions to widely litigate patents that may be worthless (as evidenced by their early termination) suggest that some or all of the related litigation may have been abusive. This litigation may have inflicted massive litigation burdens on numerous defendants in circumstances where the patent owners involved knew (or should have known) that their patents were worthless. Alternatively, heavy litigation of early expiring patents may reflect other underlying phenomena—such as the use of terminal disclaimers to extend patent examination processes for patents that later end up supporting massive litigation. Patents shaped this way (but also specially limited in patent duration) are not only not worthless but may instead be unusually valuable in large scale litigation. As described in Section IV below, it appears from the data evaluated in this study that both these abusive and strategic processes are in play, each contributing important components to high-volume patent litigation.

III. Features of Patents Pressed in High-Volume Litigation

To better understand the sources of high-volume patent litigation, several features of patents in the top one percent of most litigated patents were evaluated in detail. This section describes the technologies, innovation settings, and inventors accounting for these highly litigated patents.

A. Litigation Frequency

Even among the most litigated patents, the frequency of litigation of a given patent varied widely. The breakdown of cases per patent for the 295 patents in the top one percent of most litigated patents was as follows:

Figure 13
Top One Percent Most Litigated Patents
(26 Cases or More) by Cases Affected

Number of Cases	Number of Patents						
26	22	45	7	65	4	90	2
27	20	46	2	66	4	95	1
28	10	47	3	69	3	97	1
29	9	48	2	70	3	99	2
30	13	49	2	71	1	107	1
31	8	50	5	72	1	110	1
32	9	51	2	73	3	118	1
33	14	52	3	74	3	120	1
34	7	53	6	77	1	121	1
35	3	54	5	78	1	124	1
36	5	55	3	79	2	134	1
37	6	56	1	80	1	146	1
38	6	57	1	81	6	157	1
39	6	59	4	82	4	191	1
40	3	60	2	83	2	196	1
41	4	61	2	85	3	252	1
42	6	62	2	86	1	255	1
43	7	63	7	88	6	328	1
44	5	64	1	89	2	470	1
						Total	295

Among the patents reflected in this figure, a few outliers accounted for several thousand cases. Fifteen patents figured in over a hundred cases each and several were pressed in more than two hundred cases each. The top 15 most litigated patents (representing about .05 percent of the litigated patents in the study and .0005 percent of all the patents examined) accounted for 2829 cases or about 3.6 percent of the patent cases in the study. Thus, a very few heavily litigated patents (and associated litigation decisions) were amplified into enormous litigation impacts.

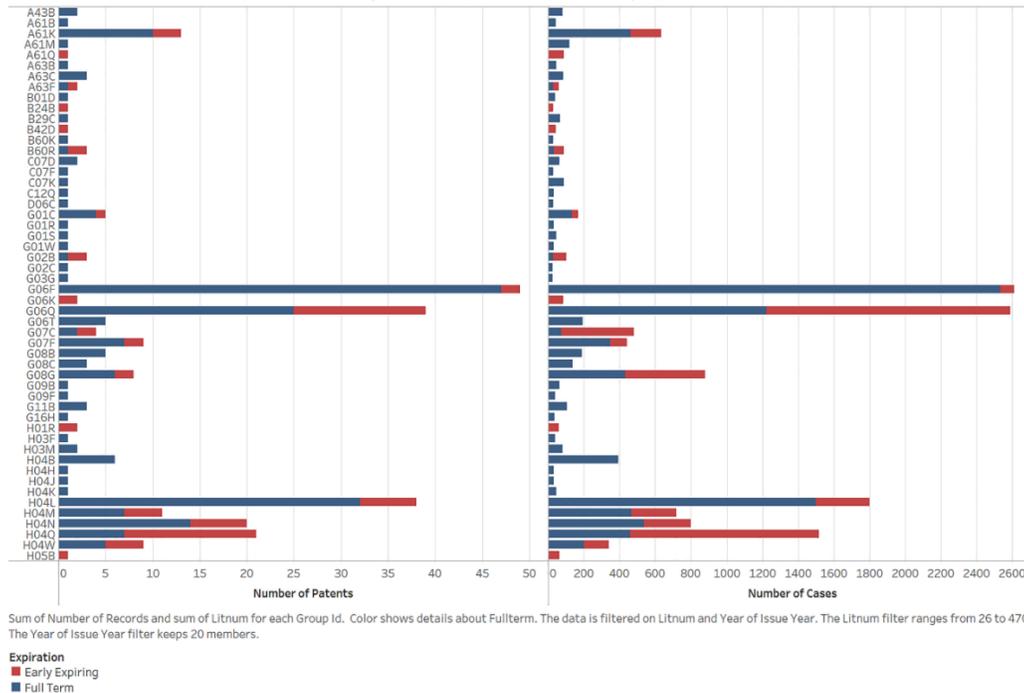
B. Technologies Covered

Most high-volume patent litigation was concentrated in a few technology areas. The following figure summarizes the breakdown of highly litigated patents by CPC technology subclasses (identified in the left column of the figure).²⁴

²⁴ The technologies within the indicated CPC technology subclasses are described in United States Patent and Trademark Office, *Patent Classification*, *supra* note 17.

Figure 14
Most Litigated Patents (26 Cases or More) by CPC Technology Subclass

Top One Percent Most Litigated Patents (1985-2007; 26 Cases or More) by CPC Technology Subclass and Expiration



The size of the bars in this figure reflects the number of heavily litigated patents and affected cases for each of the indicated CPC technology subclass. The colored sub-portions of each bar indicate the fraction of patents extended to full term (blue) or expiring early (red), and the resulting cases that involved those patents.

This technology breakdown reveals three important features of high-volume patent litigation. First, high-volume patent litigation has been concentrated in a few technology areas. Just four CPC subclasses—G06F (involving advances in electronic data processing²⁵), G06Q (involving data processing systems specially adapted for administrative, commercial, financial, managerial, supervisory, or forecasting purposes²⁶), H04L (involving the transmission of digital information²⁷), and H04Q (involving methods or apparatus for selectively establishing connections between items and transferring information via the connection or for selectively transmitting

²⁵ United States Patent and Trademark Office, *Classification Resources: CPC Subclass G06F*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-G06F.html#G06F> (last visited on Aug. 3, 2021).

²⁶ United States Patent and Trademark Office, *Classification Resources: CPC Subclass G06Q*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-G06Q.html#G06Q> (list visited on Aug. 3, 2021).

²⁷ United States Patent and Trademark Office, *Classification Resources: CPC Subclass H04L*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-H04L.html#H04L> (last visited on Aug. 3, 2021).

information to certain items over previously established connections²⁸)—stand out as sources of especially high numbers of patent cases (with patents in each technology figuring in over 1,500 cases). A few additional CPC subgroups—A61K (involving drugs and other body treating compositions²⁹), G08G (involving traffic location, navigation, and control systems³⁰), H04M (involving telephonic equipment and systems³¹), H04N (involving television and other pictorial transmission equipment and systems³²)—produced over 500 cases each.

Second, numbers of cases per patent for heavily litigated patents varied by technology type. For a few technologies, the rates of litigation per patent were particularly high. The following figure summarizes variations in average cases per patent for heavily litigated patents across CPC technology subclasses (only subclasses with five or more heavily litigated patents are represented in this figure).

²⁸ United States Patent and Trademark Office, *Classification Resources: CPC Subclass H04Q*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-H04Q.html#H04Q> (last visited on Aug. 3, 2021).

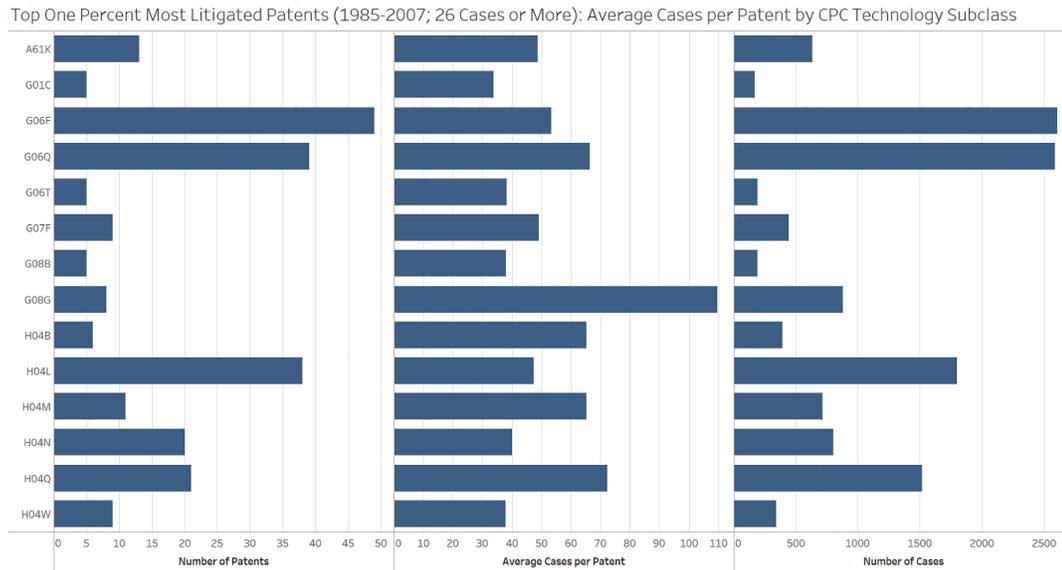
²⁹ United States Patent and Trademark Office, *Classification Resources: CPC Subclass A61K*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-A61K.html#A61K> (last visited on Aug. 3, 2021).

³⁰ United States Patent and Trademark Office, *Classification Resources: CPC Subclass G08G*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-G08G.html#G08G> (last visited on Aug. 3, 2021).

³¹ United States Patent and Trademark Office, *Classification Resources: CPC Subclass H04M*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-H04M.html#H04M> (last visited on Aug. 3, 2021).

³² United States Patent and Trademark Office, *Classification Resources: CPC Subclass H04N*, USPTO.Gov, <https://www.uspto.gov/web/patents/classification/cpc/html/cpc-H04N.html#H04N> (last visited on Aug. 3, 2021).

Figure 15
Most Litigated Patents (26 Cases or More):
Cases per Patent by CPC Technology Subclass



As the middle column in this figure indicates, case filings per patent varied substantially across the different CPC technology subclasses listed. Case filings per patent were particularly high for advances in CPC subclass G08G³³ leading to large numbers of cases based on relatively few patents. By contrast, CPC subclass H04L³⁴ contained a relatively large number of highly litigated patents but these were litigated at a lower number of cases per patent resulting in a high total case count that was primarily a product of high numbers of patents rather than high cases per patent. The most litigated CPC subclasses G06F³⁵ and G06Q³⁶—with many litigated patents—had a cases per patent ratio that was similar to ratios for other technologies. This suggests that cases per patent varied in response to different factors than those driving differences in numbers of litigated patents. The reasons behind the differences in cases per patent seen here—and whether they stem primarily from distinctive patent features, the commercial contexts in which the patents were litigated, differences across technologies in the complexity or difficulty of patent litigation, or other technology-specific factors—will require further study to ascertain.

³³ Subclass G08G encompasses advances related to traffic location, navigation and control systems. See *Classification Resources: CPC Subclass G08G*, *supra* note 30.

³⁴ Subclass H04L encompasses advances related to transmission of digital information. See *Classification Resources: CPC Subclass H04L*, *supra* note 27.

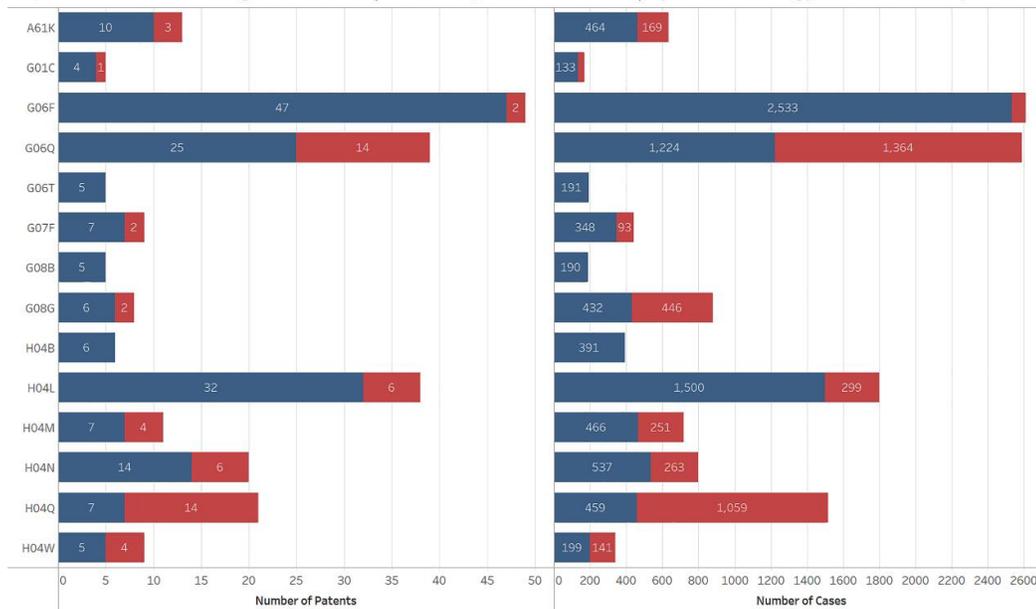
³⁵ Subclass G06F encompasses advances in electronic data processing. See *Classification Resources: CPC Subclass G06F*, *supra* note 25.

³⁶ Subclass G06Q encompasses advances in data processing systems especially adopted for administrative, commercial, financial, managerial, supervisory, or forecasting purposes. See *Classification Resources: CPC Subclass G06Q*, *supra* note 26.

Third, the percentages of early expiring patents resulting in high-volume litigation varied greatly by technology type. To explore this feature further (and to highlight the many patent cases dependent on early expiring patents), the following figure summarizes the numbers of full term and early expiring patents in each of the listed CPC technology subclasses (only subclasses with at least five heavily litigated patents are included in this figure; the values in each colored bar reflect the number of patents or cases for each technology-patent expiration category).

Figure 16
Most Litigated Patents (26 Cases or More):
Fractions Full Term and Early Expiring by CPC Technology Subclass

Top One Percent Most Litigated Patents (1985-2007; 26 Cases or More) by CPC Technology Subclass and Expiration



Sum of Number of Records and sum of Litnum for each Group Id. Color shows details about Fullterm. For pane Sum of Number of Records: The marks are labeled by sum of Litpatent. For pane Sum of Litnum: The marks are labeled by sum of Litnum. The data is filtered on Litnum and Year of Issue Year. The Litnum filter ranges from 26 to 470. The Year of Issue Year filter keeps 20 members. The view is filtered on Group Id, which keeps 14 of 1,029 members.

Expiration
■ Early Expiring
■ Full Term

This breakdown confirms that early expiring patents (resulting in thousands of related cases) figure prominently in large-volume litigation concerning some but not all technologies. Early expiring patents produced a majority of the cases for technologies in CPC subclasses G06Q and H04Q. Features of these technologies, patent application practices concerning these technologies, or litigation tactics specific to these technologies may account for the many cases based on early expiring patents.

By contrast, some technologies—including the most frequently litigated technologies in CPC subclass G06F (involving electronic data processing advances)—produced very little litigation based on early expiring patents. Only 2 of 49 heavily litigated patents in subclass G06F (or about 4 percent of such patents) expired early, resulting in 75 of the total 2,608 case assertions involving patents in this technology subclass (or about 2.9 percent of such assertions). In this technology area, case

assertions based on early expiring patents appear to be rare.

Most of the other CPC technology subclasses reflected in the above figure had percentage of case assertions based on early expiring patents that were between these two extremes. Yet, total numbers of case assertions based on early expired patents were still large for some the additional subclasses. CPC subclasses A61K, G06Q, G08G, H04L, H04M, H04N, H04Q, and H04W each had 100 or more case assertions based on early expiring patents.

C. Sources of Highly Litigated Patents

1. Country Sources

Patented inventions produced in the United States were by far the most important sources of patent litigation examined in the study. Foreign inventions were far less likely to figure in patent litigation and even less likely to be among the most litigated patents. For purposes of invention source determinations in this study, the geographic source of each patented invention was presumed to be the location of the lead inventor listed on the associated patent. The breakdown of domestic and foreign sources of litigated patents (and the corresponding breakdown of patents in the top one percent of most litigated patents asserted in 26 cases or more) was as follows.

Figure 17
Percentages of Litigated Patents and Patent Case Assertions
from United States and Foreign Sources

Source	All Patents	Percent	Litigated Patents	Percent	Cases	Percent	Top One Percent	Percent	Cases	Percent
US	2,785,255	51.84%	25,740	79.87%	71,432	81.53%	260	88.14%	14,290	90.03%
Foreign	2,587,489	48.16%	6,487	20.13%	16,186	18.47%	35	11.86%	1,582	9.97%
All	5,372,744	100.00%	32,227	100.00%	87,618	100.00%	295	100.00%	15,872	100.00%

United States patents were much more likely to be litigated (and even more likely to be heavily litigated) than their foreign counterparts. The likelihood that a particular patent from a domestic or foreign source was litigated was as follows.

Figure 18
Litigation Likelihood –
Patents from United States and Foreign Sources

Source	All Patents	Litigated Patents	Likelihood Litigated	Top One Percent	Likelihood Top One Percent
US	2,785,255	25,740	0.92%	260	0.0093%
Foreign	2,587,489	6,487	0.25%	35	0.0014%
All	5,372,744	32,227	0.60%	295	0.0055%

Patents from United States sources were almost four times more likely to be litigated than their foreign-originated counterparts. United States originated patents were almost seven times more likely to be within the top one percent of litigated patents than their foreign counterparts.

Not only were patents from United States sources more likely to be litigated, but, when litigated, these patents tended to be asserted in more cases per patent than their foreign counterparts. The average number of cases per litigated patent for all patents in the study was 2.72. The average for United States patents was 2.78 cases per litigated patent while the average for foreign patents was 2.49 cases per litigated patent. These figures diverged even more for heavily litigated patents. Among the top one percent most litigated patents (pressed in 26 cases or more), patents originating in the United States were asserted in an average of 54.96 cases per patent while similar heavily litigated patents originating overseas were asserted in an average of 45.20 cases per patent.

Only a few countries other than the United States accounted for patents in the most litigated group. The breakdown of countries producing patents in the top one percent most litigated patents (each litigated in 26 cases or more) was as follows.

Figure 19
Sources of Heavily Litigated Patents by Country

Country	Patents	Cases	Cases per Patent
AR	1	52	52.00
AU	4	235	58.75
CA	6	466	77.67
DE	4	126	31.50
GB	4	194	48.50
IL	5	166	33.20
IT	1	43	43.00
JP	4	109	27.25
KR	1	27	27.00
NL	2	67	33.50
NZ	1	33	33.00
SE	2	64	32.00
US	260	14290	54.96
Total	295	15872	53.80

In addition to being by far the biggest source of heavily litigated patents, the United States accounted for more cases per patent than most other countries. The one notable exception was Canada whose inventors accounted for many more cases per patent than their counterparts in the United States.

It is unclear why domestic inventions so clearly dominate American patent litigation. Several possible mechanisms may have contributed to this result.

First, United States patents based on foreign inventions may be held mostly by foreign owners who are less likely to litigate their patents than domestic owners (who tend to hold patents based on inventions made in the United States). This rationale assumes that foreign owners will press less patent litigation even if they hold similar United States patents to those of United States patent owners. However, this difference seems counterintuitive. Foreign holders of United States patents have the same reasons to press associated patent litigation as American owners. Lesser litigation levels would suggest that foreign and domestic businesses have different willingness to capitalize on the strength of United States patent rights. In particular, patent infringement claims based on similar patents that were withheld by foreign owners but asserted by domestic owners would indicate that foreign companies are more willing to sacrifice valuable patent litigation opportunities than their United States counterparts. Such a difference would be contrary to the normally active and intense competition between domestic and foreign companies in the same industries.

Another possibility is that parties specializing in large-scale patent litigation³⁷ may either be concentrated in the United States (and tend to hold and enforce patents originating in the United States) or have emphasized acquisitions of United States-originated patents (resulting in their bringing a high proportion of cases based on such patents). While this would explain many of the geographic features of the litigation patterns seen in this study, a strategic emphasis of specialized patent litigators on United States-originated patents would raise important further questions. What discourages these specialists from pursuing similar heavy litigation of foreign patents? Why do litigants driven by the economic potential of patent litigation and licensing opportunities deemphasize and forgo acquisition of foreign patents for litigation while differentially acquiring similar United States patents? Are these patent litigation specialists leaving valuable opportunities on the table by foregoing mass-scale litigation based on foreign patents? The present study can not answer these questions, but the answers are important if the practices of domestic patent litigation specialists account for the dominance of United States-originated patents in patent litigation.

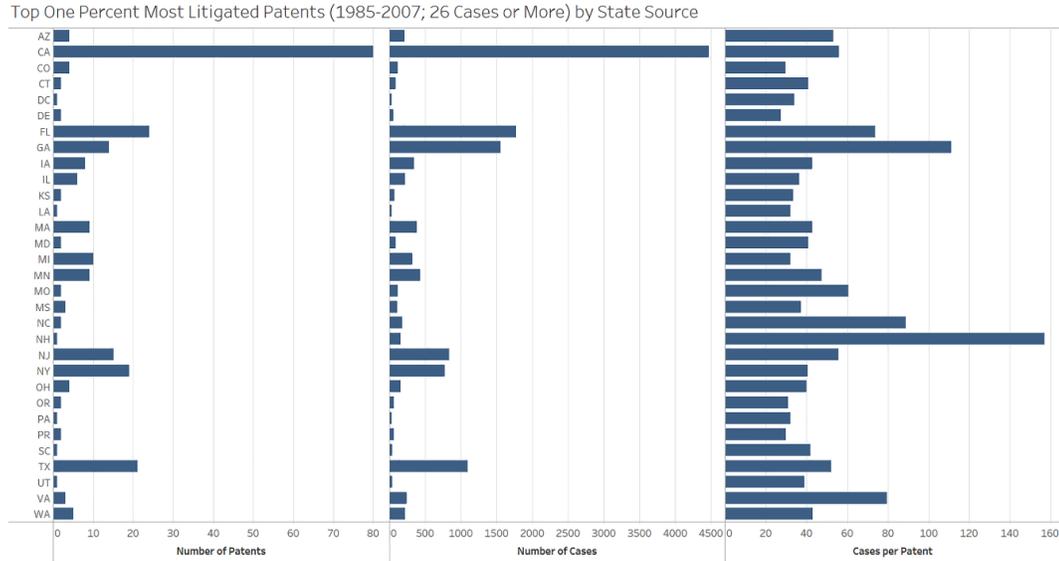
Finally, patents based on United States inventions may be more valuable in mass-scale litigation than their foreign counterparts. Under this logic, United States originated patents are asserted more frequently in litigation because they are more effective there in producing profitable returns. There are several possible reasons why they may be more effective litigation vehicles. First, patented advances produced in the United States may be more valuable to users leading to broader infringement and larger damage recoveries. Second, United States-originated patents may be superior legally—that is, more likely to hold up under court scrutiny than those based on foreign inventive activities and related patent applications. Third, United States-originated patents may be superior in commercial targeting and drafting—that is, more likely to contain patent claims that apply to valuable commercial practices and therefore to produce especially large settlements and licensing royalties when asserted in litigation. Any or all of these attractive features might cause patents based on United States inventions to be asserted more often in litigation and to be pressed in more cases per patent than their foreign counterparts. A full explanation of the dominance of domestic patents in mass-scale patent litigation will require more extensive scrutiny of the details of particular patent cases and the filing considerations underlying them.

2. *State Sources*

Among the 260 patents in the top one percent most litigated patents originating in the United States—each asserted in 26 cases or more—some surprising state sources accounted for the bulk of heavily litigated patents and associated case assertions. The breakdown of states producing patents in the top one percent of most litigated patents was as follows.

³⁷ Including “patent trolls” pursuing litigation in the absence of marketing of related patented products or services, at least to the extent that these entities press their patents against numerous defendants.

Figure 20
State Sources of Most Litigated Patents



California was, not surprisingly, the largest source of heavily litigated patents because it is the largest source of patents generally. But Florida and Georgia, not sources of large numbers of patents, were the second and third largest sources of heavily litigated patents. Patents emerging from Florida and Georgia were substantially more likely to be involved in large-volume litigation than patents from California. The following figure describes the likelihood that a patent from each of these three states was litigated or highly litigated.

Figure 21
Litigation Likelihoods for Patents from
California, Florida, and Georgia (1985–2007)

Source	All Patents	Litigated Patents	Likelihood Litigated	Top One Percent	Likelihood Top One Percent
CA	287,697	5,205	1.81%	80	0.0278%
FL	46,983	942	2.00%	24	0.0511%
GA	21,868	496	2.27%	14	0.0640%
All US	2,785,255	25,740	0.92%	260	0.0093%
All	5,372,744	32,227	0.60%	295	0.0055%

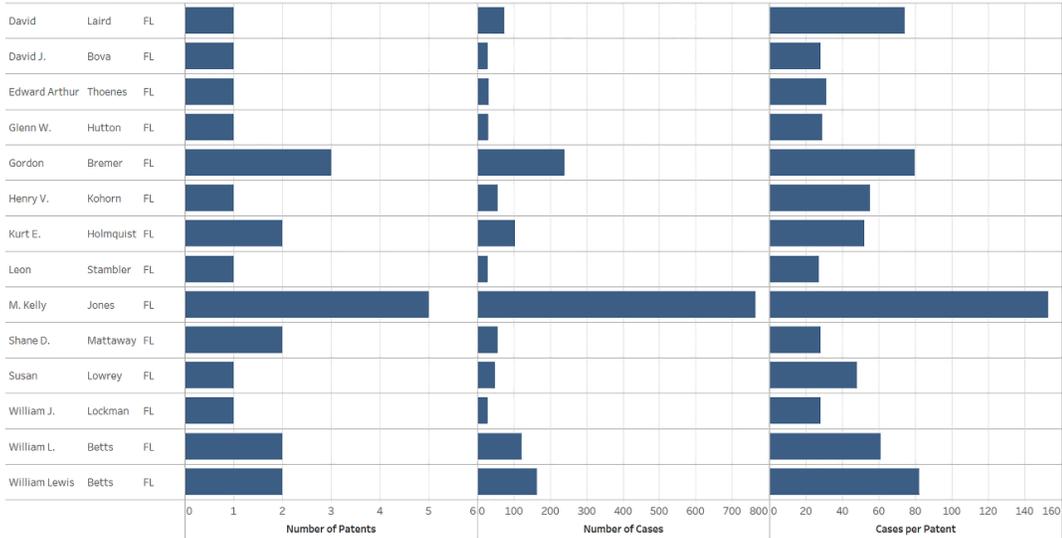
The likelihood of a patent from Florida or Georgia being heavily litigated was about an order of magnitude higher than for all patents considered in the study. Florida and Georgia also had high rates of cases filed per heavily litigated patent leading to 1,769 case assertions based on heavily litigated patents from Florida and 1,555 case assertions based on heavily litigated patents from Georgia. These case assertions exceeded those for several states—such as Massachusetts, New York, and Texas—that were much larger sources of new technologies and associated patents.³⁸

These figures indicate that Florida and Georgia innovators produced unusually large numbers of advances involved in high-volume patent litigation. The following figure describes the inventors in these two states accounting for the enormous numbers of patent assertions derived from Florida and Georgia inventions.

³⁸ Over the period reflected in Figure 21 (including United States utility patents issued in 1985 to 2007), the following states all had patent totals exceeding those for Florida and Georgia: California (287,697 patents), Illinois (69,508), Massachusetts (62,319), Michigan (70,451), Minnesota (51,020), New Jersey (72,015), Ohio (57,431), Pennsylvania (65,916), New York (113,274), and Texas (101,503).

Figure 22
Florida Inventors Producing Most Litigated Patents

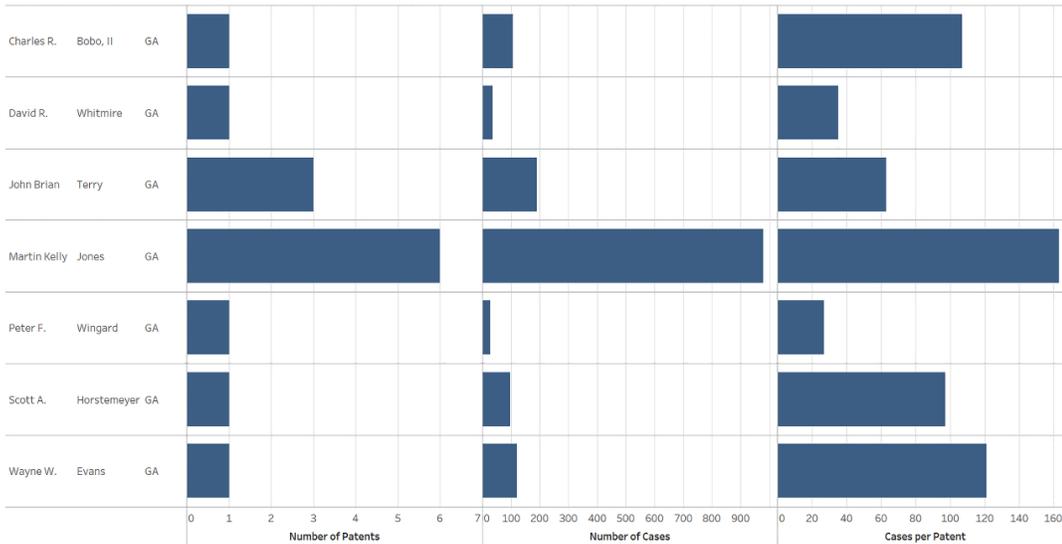
Top One Percent Most Litigated Patents (1985-2007; 26 Cases or More): Florida Inventors



Sum of Number of Records, sum of Litnum and average of Litnum for each State broken down by Name First and Name Last. The data is filtered on Litnum, Year of Issue Year and Country. The Litnum filter ranges from 26 to 470. The Year of Issue Year filter keeps 20 members. The Country filter keeps US. The view is filtered on State, which keeps FL.

Figure 23
Georgia Inventors Producing Most Litigated Patents

Top One Percent Most Litigated Patents (1985-2007; 26 Cases or More): Georgia Inventors



Sum of Number of Records, sum of Litnum and average of Litnum for each State broken down by Name First and Name Last. The data is filtered on Litnum, Year of Issue Year and Country. The Litnum filter ranges from 26 to 470. The Year of Issue Year filter keeps 20 members. The Country filter keeps US. The view is filtered on State, which keeps GA.

As these figures confirm, a few Georgia and Florida inventors produced the advances at issue in an enormous number of patent cases. Indeed, one inventor—Martin Kelly Jones, apparently working in both Florida and Georgia—produced a remarkable number of heavily litigated patents and extensive related litigation emerging from

these states. Jones' 11 heavily litigated patents were asserted in 1,743 cases at an average level of 158 assertions per patent. Thus, while all the Florida and Georgia inventors mentioned in these two figures played key roles in producing patents leading to large scale patent litigation, the core of the litigation story from these states resolves down to just one mass-scale litigation source.

IV. Strategy and Abuse in High-Volume Patent Litigation

A detailed examination of litigation involving the 295 patents identified in this study as comprising the top one percent of most litigated patents (each asserted in 26 cases or more) revealed that these patents fell into three expiration subcategories: 1) patents with continuing owner confidence in patent value (resulting in extension of the patents to full patent terms via payment of all required maintenance fees), 2) patents allowed to expire early via terminal disclaimers (probably reflecting a tradeoff of enhanced patent enforcement in the short term against diminished patent duration), and 3) patents allowed to expire early without the special impacts of terminal disclaimers (probably reflecting decisions of patent owners to abandon the patents as worthless). Mass-scale litigation based on each of these patent subcategories has different implications. Subsection A breaks down the prevalence of these three types of litigation. Subsection B interprets the meaning of each of these types of mass-scale patent litigation.

A. Breakdowns of Heavily Litigated Patents by Expiration Type

The fractions of heavily litigated patents in the three categories just described were as follows.³⁹

Figure 24
Expiration Types Among Most Litigated Patents

Type	Patents	Percent	Cases	Percent
Full Term	222	75.25%	10740	67.67%
Early Expiring -- Terminal Disclaimer	45	15.25%	3034	19.12%
Early Expiring -- Abandoned	28	9.49%	2098	13.22%
Total	295	100.00%	15872	100.00%

The two varieties of early expiring patents each accounted for meaningful fractions of the heavily litigated patents and even larger fractions of resulting case assertions. Together, these two types of early expiring patents produced about a third of the case assertions involving heavily litigated patents.

³⁹ Among the 73 heavily litigated and early expiring patents considered in the study, patents with terminal disclaimers were identified by examining the face of the issued patents where such disclaimers are noted if present.

B. Interpreting Heavy Litigation Patterns Across Patent Expiration Types

1. *Patents Extended to Full Term*

The bulk of heavily litigated patents were extended to full term, meaning that the owners of these patents reached coherent value assessments in both maintenance fee and litigation decisions. Patent owners felt their interests were valuable enough to warrant full maintenance fee payments and, in some cases, the realization of the full value of these patents required litigation. For all litigated patents, full term patents represented about 80 percent of the sources of litigation (22,480 full term patents were litigated out of a total of 28,065 litigated patents).

Litigated patents still comprised only a relatively small set of full-term patents (22,480 full term patents were litigated out of a total of 1,288,505 such patents, meaning that the litigated component comprised about 1.74 percent of full-term patents). Why even more owner-valued patents—that is, patents extended to full term—were not litigated (or, if litigated, were not litigated sufficiently to bring them within the top one percent of most litigated patents) can not be ascertained from the data examined in this study. The factors accounting for the litigation of only some valued patents may depend more on surrounding commercial environments than on the patents themselves. Only patents establishing rights over substantial commercial processes and potentially leading to correspondingly large infringement damage recoveries would warrant confronting the expense and risks of patent litigation, not to mention the multiplied expense and risk of high-volume patent litigation. In addition, even where large commercial stakes are at issue in potential patent litigation, the willingness of asserted infringers to enter into patent licenses covering their actions would greatly influence patent litigation likelihoods and case volumes.

While the correlation between full term patent extension and litigation decisions was strong at lower litigation levels, it appeared to weaken at the upper extremes of high-volume patent litigation. Lower fractions of patents were extended to full term among the top one percent of most litigated patents than in the general population of litigated patents. Even smaller percentages of patents were extended to full term among patents litigated extremely frequently in 85 or more cases per patent. The percentages of full-term patents at increasing litigation levels are reflected in the following figure.

Figure 25
Percentages of Full-Term Patents at Top Litigation Volumes

	All Patents	All Litigated Patents		Top 1%		85 Cases or More	
	Patents	Patents	Cases	Patents	Cases	Patents	Cases
Full Term	1,288,505	22,480	60,615	222	10,740	17	2,018
Expired Year 12	540,664	3,573	11,785	51	3,721	13	2,063
Expired Year 8	561,575	1,501	3,860	18	1,156	3	365
Expired Year 4	415,238	511	997	4	255	0	0
Total	2,805,982	28,065	77,257	295	15,872	33	4,446
	All Patents	All Litigated Patents		Top 1%		85 Cases or More	
	% Patents	% Patents	% Cases	% Patents	% Cases	% Patents	% Cases
Full Term	45.92%	80.10%	78.46%	75.25%	67.67%	51.52%	45.39%
Expired Year 12	19.27%	12.73%	15.25%	17.29%	23.44%	39.39%	46.40%
Expired Year 8	20.01%	5.35%	5.00%	6.10%	7.28%	9.09%	8.21%
Expired Year 4	14.80%	1.82%	1.29%	1.36%	1.61%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The diminishing fractions of full term patents among litigated patents (and diminishing percentages of case assertions based on such patents) as litigation volumes increased suggests that mass case filings at top litigation levels depend on factors other than the patent valuations driving decisions to pay maintenance fees. At top litigation levels, patents not lasting to their full terms play much bigger roles than at lower litigation levels. At the highest litigation levels reflected in this figure—involving patents asserted in 85 cases or more—early expiring patents accounted for a majority of patent assertions.

Processes underlying so many cases based on specially curtailed and abandoned patents deserve special attention. As described in the next two subsections, two different processes seem to be at work. First, “terminal disclaimers” agreed to by patent applicants prevent some heavily litigated patents from continuing to full terms. These patents are probably especially valuable rather than worthless because the patents have been crafted in extended patent application processes to be “weaponized” for effective patent litigation. They appear in numerous cases because they were designed to do so. Second, a separate component of heavily litigated patents are not artificially limited in duration by terminal disclaimers but are nonetheless allowed to expire early through their owner’s nonpayment of maintenance fees. These patents are simply abandoned by their owners, presumably because the owners have lost faith in the value of the patents. Large-scale litigation based on patents that even their owners ultimately view as worthless may reflect significant litigation abuse and related waste of litigation and commercial resources.

2. *Early Expiring Patents With Terminal Disclaimers*

a. The Strategic Advantages of Extended Patent Crafting

Heavily litigated patents that expire early due to terminal disclaimers are frequently products of long-planned and executed patenting and patent enforcement strategies. The strategies turn on the use of terminal disclaimers to extend patent examination processes and thereby to tune the patents involved to their commercial contexts in ways that enhance the likelihood and scope of patent infringement. The resulting patents have significant advantages in both patent litigation and associated patent licensing programs that turn on threats of patent litigation.

Terminal disclaimers involve voluntary limitations of patent duration agreed to by patent applicants.⁴⁰ Terminal disclaimers are tactical measures, accepted by patent applicants in exchange for issuance of patents perfected during extended patent application processes.⁴¹ Delays in these processes permit applicants to defer the point when patent claim are finalized. With more time, patent applicants can scrutinize commercial activities related to inventions and project likely features of future patent infringement. With this enhanced knowledge, later developed patent claims can be crafted to ensure that they cover the maximum possible range of future infringement. This sort of strategic crafting of patent claims over extended periods can significantly enhance the range (and simplicity) of resulting infringement claims and increase associated patent enforcement threats.

Patents with terminal disclaimers that are subsequently pressed in large numbers of patent cases are simply being used for their intended purposes. These patents were

⁴⁰ “A terminal disclaimer is a statement in which a patentee or applicant disclaims or dedicates to the public the entire term or any terminal part of the term of a patent or patent to be granted (filed in an application).” United States Patent and Trademark Office, MPEP § 1490, <https://www.uspto.gov/web/offices/pac/mpep/s1490.html> (last visited Aug. 3, 2021).

⁴¹ Terminal disclaimers are used in contexts where a single patent application is used to support additional, later filed applications. The later applications are referred to “continuations” of the original application. A later application that includes all of the factual description of the original application is a simple continuation application; a later application that adds new content (typically referred to as “new matter”) is a continuation-in-part application (because only a part of the new application is continued from the earlier one). *See generally Continuation Patent Practice*, MAIORANA, P.C. (2017), <https://www.maioranapc.com/blog/2017-01-Continuation-Patent-Practice.htm>.

Continuation applications have two advantages in patenting processes. First, the later applications retain the benefits of the original filing date of the first application (at least with respect to contents that are carried over into the additional applications). An early filing date can mean that the patentability of an invention described in a later application is judged against the relatively undeveloped state of technology at the earlier date, leading to a more likely finding that the invention meets patent law tests for novelty and distinctive departure from earlier technology designs. Second, continuation applications allow patent applicants to extend the patent application process and revise or extend their claims based on new information gained over time. Additional patent claims (describing assertedly infringing activities) may be included in continuation applications for several strategic reasons. These include expanding claims to reflect new insights of applicants about how an invention might be included in commercial practices, tailoring claims to ensure that identified uses of an invention are found infringing, and heavily populating an area of activity with claims to support licensing programs targeting that area. *See id.*

specially designed and targeted to sweep broadly within known commercial activities. In large volume litigation, they are asserted against numerous purported infringers, many of whom may have already been targeted when the patents were drafted. Some of these specially crafted patents are asserted in litigation; others are enforced against numerous targets in licensing programs (with litigation providing a spur to those parties hesitant to get a license). The enforcement program adopted by patent owners for realizing returns on these broadly targeted patents may vary with factors like the aggressiveness of the patent holders, the recalcitrance of potential licensees in agreeing to licenses, or other industry-specific features of the patents and surrounding commercial contexts.

For present purposes, the importance of early expiring patents with terminal disclaimers is that the extended patent crafting leading to the disclaimers identifies the patents involved as especially well-situated upon patent issuance for later widespread patent enforcement. Given their extended crafting, it is hardly surprising that these specially designed patents figure extensively in large-scale patent litigation.

The economic tradeoff or “bet” that underlies terminal disclaimers suggests that intensive litigation of the affected patents was probably within owners’ expectations all along. Applicants anticipated that the enhanced patent enforcement value they gained by extending their applications forward in time was worth more than the loss of several years of patent enforcement duration via agreement to a terminal disclaimer. The bet made by these applicants was that well-tailored claims were worth more than the loss of longer enforcement.

b. An Example of Extended Crafting of a Heavily Litigated Patent

An example of the features and litigation history of one heavily litigated patent artificially limited by a terminal disclaimer illustrates the types of patent litigation targeting advantages gained by advantageous patent crafting through extended periods of patent examination.

The Patent: Telephone Interface Call Processing System (US5828734A)

United States Utility Patent No. 5,828,734 (hereinafter “the ‘734 patent”) covers a “Telephone interface call processing system with call selectivity.”⁴² The patent protects:

[A telephone interface call processing system with call selectivity for] use with a public telephone network . . . incorporating a vast number of terminals . . . [in which] a system . . . limits and controls interface access to implement voice-digital communication for statistical processing. The system . . . accommodates calls in different modes, e.g. “800”, “900” or area code and incorporates qualifying apparatus to restrict against caller misuse.

⁴² U.S. Patent No. 5,828,734 (filed Oct. 4, 1993).

Alternative calling modes are used to reach an interface facility that also affords some control based on calling terminal identification⁴³

The ‘734 patent was issued on October 27, 1998, to assignee Ronald A. Katz Technology LP based on an application submitted by inventor Ronald A. Katz.⁴⁴ Ownership of the ‘734 patent stayed with the Ronald A. Katz Technology LP over the life of the patent (subject to several security interests taken in the patent).⁴⁵

The ‘734 patent lists an application date of October 4, 1993.⁴⁶ However, the application history underlying the ‘734 patent began far earlier than this date. The ‘734 patent traces its roots to patent application serial number 753,299 filed on July 10, 1985. The application resulting in the ‘734 patent was a “continuation-in-part” of the 1985 application, meaning that the application for the ‘734 patent continued forward part of the contents of the 1985 application in a manner that retained some of the advantages of the early filing date of the 1985 application. At the same time, the application for the ‘734 patent added further content or “new matter,” resulting in an application that was only a continuation “in part” of the earlier application.

The extended recrafting of the ‘734 patent between 1985 and its issuance in 1998 came at the price of a specially limited duration for the ‘734 patent implemented through a terminal disclaimer. Because it covered invention features that overlapped some features protected by earlier-issued patents also derived from the 1985 application (and a complex set of related applications), the ‘734 patent, with a later issue date, effectively would have extended the protections of the earlier patents beyond statutory limits unless the term of the ‘734 patent was artificially limited to match the duration of the earliest expiring related patent. This artificial limitation—required by the USPTO before authorizing issuance of the ‘734 patent—was agreed to by the applicant via filing of a terminal disclaimer statement on October 4, 1993.⁴⁷ Under this terminal disclaimer, the term of the ‘734 patent was agreed to end upon the earlier expiring of two related patents (U.S. Patent No. 5,251,252 and U.S. Patent No. 5,128,984).⁴⁸ As noted on the face of the ‘734 patent, the early termination of the ‘734 patent due to the terminal disclaimer occurred on October 5, 2010.⁴⁹ Standing alone—without a terminal disclaimer—the ‘734 patent would have expired 17 years after issuance or on October 27, 2015.⁵⁰

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ See United States Patent US5828734A, GOOGLE PATENTS, <https://patents.google.com/patent/US5828734A/en?q=US5828734A>.

⁴⁶ U.S. Patent No. 5,828,734, *supra* note 42.

⁴⁷ Ronald A. Katz, Terminal Disclaimer to Obviate a Double Patenting Rejection (37 C.F.R. 1.321(c)), <https://portal.uspto.gov/pair/view/BrowsePdfServlet?objectId=E5D4S8Y2PP1GUI2&lang=DINO>.

⁴⁸ *Id.*

⁴⁹ U.S. Patent No. 5,828,734, *supra* note 42.

⁵⁰ The normal duration of a patent based on an application filed in 1993 (assuming that all relevant maintenance fees were paid) was the greater of 17 years from the date the patent issued or 20 years from the date the patent application was filed. See United States Patent and Trademark Office, MPEP §2701, <https://www.uspto.gov/web/offices/pac/mpep/s2701.html>. In the case of the ‘734 patent, 17 years from patent issuance (a period ending on October 27, 2015) was longer than 20 years from the

While its terminal disclaimer materially shorted the patent's duration, the resulting '734 patent emerging from its extended patent examination was a carefully tuned licensing and litigation tool. The practical difference between the 1985 application and the 1993 application that led to the '734 patent was that the applicant had eight more years to reconsider and recraft the contents of the second application. Actually, this recrafting process probably extended beyond the 1993 filing date of the application resulting in the '734 patent because further changes were possible during the pendency of the 1993 application. This pendency lasted from 1993 to 1998. Hence, recrafting of the '734 patent potentially extended for over a decade between 1985 and 1998 while the 1993 application and its predecessors were pending in the USPTO.

The '734 patent that emerged from its extended crafting was a behemoth, comprised of 254 detailed patent claims describing different forms of infringing devices and activities. The USPTO classified the subject matter of the '734 patent in 60 different CPC technology subgroups. The USPTO concluded that invention described in the '734 patent was primarily a communications management advance falling within CPC Subgroup H04Q3/665: Selecting arrangements: Distributing or queuing: Traffic distributors: Circuit arrangements therefor.⁵¹ However, many other types of technologies were involved as well, ranging from methods of generating and using random numbers, multi-processor computer systems, access code authorizations, and electronic mail.⁵² With so extensive a sweep across diverse technologies, it is perhaps

date of the relevant patent application (a period ending on October 4, 2013). Because of the terminal disclaimer agreed to by the applicant, the actual term of the '734 patent depended on neither of these periods but was rather determined in accordance with the terminal disclaimer.

⁵¹ See United States Patent US5828734A, *supra* note 45.

⁵² The '734 patent was also classified by the USPTO as involving technologies in the following 59 additional CPC subgroups:

G07C11/00 Arrangements, systems, or apparatus for checking, e.g. the occurrence of a condition, not provided for elsewhere

G07C15/005 Generating random numbers; Lottery apparatus with dispensing of lottery tickets

G07C15/006 Generating random numbers; Lottery apparatus electronically

H04M11/00 Telephonic communication systems adapted for combination with other electrical systems

H04M3/36 Statistical metering, e.g. recording occasions when traffic exceeds capacity of trunks

H04M3/38 Graded-service arrangements, i.e. some subscribers prevented from establishing certain connections

H04M3/46 Arrangements for calling a number of substations in a predetermined sequence until an answer is obtained

H04M3/493 Interactive information services, e.g. directory enquiries ; Arrangements therefor, e.g. interactive voice response [IVR] systems or voice portals

H04M3/51 Centralised call answering arrangements requiring operator intervention, e.g. call or contact centers for telemarketing

H04M3/5166 Centralised call answering arrangements requiring operator intervention, e.g. call or contact centers for telemarketing in combination with interactive voice response systems or voice portals, e.g. as front-ends

H04Q3/002 Details

H04Q3/54533 Configuration data, translation, passwords, databases

H04Q3/5455 Multi-processor, parallelism, distributed systems

H04Q3/54591 Supervision, e.g. fault localisation, traffic measurements, avoiding errors, failure recovery, monitoring, statistical analysis

not surprising that the '734 patent had significant potential for widespread

H04Q3/66 Traffic distributors
H04Q3/72 Finding out and indicating number of calling subscriber
H04Q3/74 Identification of subscriber calling from a party-line
A63F2003/086 Raffle games that can be played by a fairly large number of people electric with remote participants played via telephone, e.g. using a modem
G07C2011/04 Arrangements, systems, or apparatus for checking, e.g. the occurrence of a condition, not provided for elsewhere related to queuing systems
H04M2201/40 Electronic components, circuits, software, systems or apparatus used in telephone systems using speech recognition
H04M2203/2016 Call initiation by network rather than by subscriber
H04M2242/22 Automatic class or number identification arrangements
H04M3/42059 Making use of the calling party identifier
H04M3/436 Arrangements for screening incoming calls, i.e. evaluating the characteristics of a call before deciding whether to answer it
H04Q2213/13034 A/D conversion, code compression/expansion
H04Q2213/13072 Sequence circuits for call signaling, ACD systems
H04Q2213/1309 Apparatus individually associated with a subscriber line, line circuits
H04Q2213/13091 CLI, identification of calling line
H04Q2213/13093 Personal computer, PC
H04Q2213/13095 PIN / Access code, authentication
H04Q2213/13096 Digital apparatus individually associated with a subscriber line, digital line circuits
H04Q2213/13097 Numbering, addressing
H04Q2213/13103 Memory
H04Q2213/13104 Central control, computer control
H04Q2213/13106 Microprocessor, CPU
H04Q2213/13107 Control equipment for a part of the connection, distributed control, co-processing
H04Q2213/13141 Hunting for free outlet, circuit or channel
H04Q2213/1316 Service observation, testing
H04Q2213/13164 Traffic (registration, measurement, . . .)
H04Q2213/13166 Fault prevention
H04Q2213/13167 Redundant apparatus
H04Q2213/13173 Busy signals
H04Q2213/13175 Graphical user interface [GUI], WWW interface, visual indication
H04Q2213/13178 Control signals
H04Q2213/13204 Protocols
H04Q2213/1322 PBX
H04Q2213/13256 Call screening
H04Q2213/1328 Call transfer, e.g. in PBX
H04Q2213/1332 Logic circuits
H04Q2213/13342 Arrangement of switches in the network
H04Q2213/13344 Overflow
H04Q2213/13349 Network management
H04Q2213/13352 Self-routing networks, real-time routing
H04Q2213/13353 Routing table, map memory
H04Q2213/1337 Operator, emergency services
H04Q2213/13375 Electronic mail
H04Q2213/13376 Information service, downloading of information, 0800/0900 services
H04Q2213/13377 Recorded announcement
H04Q2213/1338 Inter-exchange connection

Id.

enforcement.

The Litigation

The '734 patent was litigated in 99 cases between January 1, 2003, and December 31, 2016.⁵³ Most of these cases were filed in the Central District of California (42 cases) and the Eastern District of Texas (27 cases). The cases were filed between March 18, 2003, and May 18, 2015.

These cases were part of a patent licensing and litigation program orchestrated by Ronald A. Katz Technology Licensing LP ("RAKTL") over many years. The program reflected both sweeping patents and a willingness to aggressively litigate them. According to one summary of the early results of this patent enforcement program:

In the late 1990's, Katz set up RAKTL to license his portfolio to companies using automated call centers. Unlike many patent holders who shy away from litigation due to its high costs and uncertainty, RAKTL has been aggressive in filing lawsuits against companies that refuse to take a license. . . . A 2005 Forbes magazine article estimated that he had already earned \$750 million in licensing fees at that time and would bring in \$2 billion in fees by 2009.⁵⁴

Katz carried out aggressive licensing of his patents through an extensive licensing team backed up by numerous outside lawyers who initiated litigation where parties hesitated to get a license. Katz became a thorn in the side of telephone-related industries but achieved considerable licensing success. As of 2002 his operation was in full swing and producing extensive licensing results:

Together with an army of outside attorneys, [Katz] and his 14-person enterprise, Ronald A. Katz Technology Licensing, work feverishly to turn 46 of his patents into revenue. Some of America's largest corporations have agreed to pay Katz for licenses—AT&T, American Express, IBM, Microsoft, and Wells Fargo, to name just a few.⁵⁵

In sum, the '734 patent was a carefully shaped enforcement tool, part of a sophisticated and extensively resourced effort to gain and monetize broad patent rights. The patent was designed for extensive enforcement against concrete targets (identified during the patent's long development in examination before the USPTO). Mass-scale litigation based on the '734 patent was part of the overall plan for broad licensing and enforcement of the patent, a strategy that apparently produced considerable gains for the patent owner.

While it may have been unusual in its predetermination and scope, the

⁵³ These cases are described in the patent litigation database created by David L. Schwartz, Ted Sichelman, and Richard Miller. *See* Schwartz, *supra* note 8.

⁵⁴ Robert Ambrogi, *For Ronald Katz, Patent Litigation Pays Billions*, IMS EXPERT SERVICES, <https://www.ims-expertservices.com/insights/for-ronald-katz-patent-litigation-pays-billions/> (last visited on Aug. 3, 2021).

⁵⁵ Eric W. Pfeiffer, *Setting Patent Traps*, FORBES.COM (Jun. 24, 2002), https://www.forbes.com/asap/2002/0624/065_print.html.

enforcement program pursued by the owner of the '734 patent seems consistent with the basis bargain of the patent system—broad rewards were achieved for broad usage of an apparently widely valuable patented advance. Hence, the enforcement of the '734 patent is arguably a reflection of a specialized and successful attempt to use the enforcement features of the patent system for the system's intended purpose.

3. *Early Expiring Patents Apparently Abandoned*

a. Implications of Heavy Litigation of Ultimately Abandoned Patents

In contrast to the '734 patent and other early expiring patents with terminal disclaimers that were heavily litigated, an additional group of heavily litigated patents were subsequently abandoned by their owners through non-payment of maintenance fees. The owners involved appear to have believed that the last years of their patents' terms—normally the most value periods of patent enforcement—were not worth the relatively modest maintenance fees needed to keep the patents in force. This abandonment of patents perceived as worthless after having pressed the same patents aggressively in litigation suggests that the associated litigation may have been abusive from the outset. The extensive range of cases involved may have been based on patents that the owners knew (or should have known) were flawed and worthless. This type of litigation abuse deserves further study and potential reform.

The absence of litigation in the last years of the potential duration of these patents is particularly surprising since patents typically have their greatest enforcement value late in their terms. Years near the end of patent life are usually the most profitable for patent licensing and litigation for several reasons. It often takes many years for the full commercial importance of a patented invention to be developed and fully implemented. This means that the scope of infringing activities—and the value of patent litigation recoveries or licensing royalties—will tend to increase with time. Accordingly, infringement damages tend to be the largest at the end of patent terms. Yet, for the heavily litigated patents that are ultimately abandoned, litigation covering the last years of patent life is sacrificed through patent abandonment for the same patents that are intensely asserted earlier in their terms.

b. An Example of Broad Litigation of an Abandoned Patent

An account of the litigation history of one highly litigated patent that was later abandoned by its owner (via non-payment of required maintenance fees) will clarify the extensive litigation impacts that can follow from apparently worthless patents. The following account summarizes both the features of the patent involved and the extensive litigation it inspired.

The Patent: Vehicle Status Notification Systems and Methods (US6904359B2)

United States Utility Patent No. 6,904,359 (hereinafter “the ‘359 patent”) covers “Notification systems and methods with user-definable notifications based upon occurrence of events.”⁵⁶ It was issued on June 7, 2005.⁵⁷ The patent protects:

Methods and systems . . . for a vehicle status reporting system for allowing a user to define when a user will receive a vehicle status report about the status of a mobile vehicle, in relation to a location, for establishing a communication link between the system and the user, and for delivering the status report during the communication link, the status report indicating occurrence of one or more events.⁵⁸

The sole inventor of the advance was M. Kelly Jones. The USPTO classified the subject matter of the ‘359 patent within the following CPC technology classification subgroups:⁵⁹

G06Q10/08—Logistics, e.g. warehousing, loading, distribution or shipping; Inventory or stock management, e.g. order filling, procurement or balancing against orders

G08G1/123—Traffic control systems for road vehicles indicating the position of vehicles, e.g. scheduled vehicles; Managing passenger vehicles circulating according to a fixed timetable, e.g. buses, trains, trams

G01S2205/008—Transmission of position information to remote stations using a mobile telephone network

G01S5/0027—Transmission from mobile station to base station of actual mobile position, i.e. position determined on mobile⁶⁰

Ownership of the ‘359 patent flowed through several hands.⁶¹ It was assigned prior to issuance to ArrivalStar S.A., a Florida company located in the same city as the innovation’s inventor. The patent later passed into the hands of Melvino Technologies Limited, located in the British Virgin Islands, and Shipping and Transit, LLP, located in Pennsylvania. The patent lapsed on June 17, 2017 (12 years after issuance) due to non-payment of maintenance fees.⁶²

The Litigation: The Scope of Cases

The ‘359 patent figured in 470 cases between January 1, 2003, and December 31, 2016, despite being ultimately abandoned as worthless by its owner.⁶³ Cases were

⁵⁶ U.S. Patent No. 6,904,359.

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ The Cooperative Patent Classification (CPC) technology classification system is used by the USPTO and the patent offices of many other countries to characterize the technologies covered by patents. See United States Patent and Trademark Office, *Patent Classification*, *supra* note 17.

⁶⁰ See United States Patent US6904359B2, GOOGLE PATENTS, <https://patents.google.com/patent/US6904359B2/en?q=US6904359B2>.

⁶¹ *Id.*

⁶² *Id.*

⁶³ These cases are described in the patent litigation database created by David L. Schwartz, Ted Sichelman, and Richard Miller. See Schwartz, *supra* note 8.

filed in 34 different federal districts. The top targets were the Southern District of Florida (317 cases), the Northern District of Illinois (79 cases), the Central District of California (12 cases), and the Northern District of California (8 cases). The case filing dates ranged from January 1, 2006, to December 22, 2016. Thus, as late as six months before abandoning the patent, its owners were still asserting it in freshly filed patent litigation.

Defendants in cases based on this patent included numerous shipping companies, many vendors of global tracking products and services, and such additional and diverse entities as the City of Albuquerque, the Canadian National Railway Company, the Ford Motor Company, US Airways, Macy's, Cincinnati Bell, Lufthansa German Airlines, Archer-Daniels Midland Company, Bed Bath & Beyond, Safeway, Stride Rite Children's Group, The Pep Boys-Manny, Moe & Jack, Crocs, Pacific Sunwear of California, Sharp Electronics, L.L. Bean, Spanx, Panasonic Corporation, Gatorade, Starbucks Coffee, Gamestop, PetSmart, Dunkin' Brands, and Benjamin Moore & Co.⁶⁴ Needless to say, this was broadly focused litigation.

The Litigation: A Single Illustrative Case

The history of one of the 470 cases based on the '359 patent gives a rough idea of the commercial circumstances involved in such litigation. ArrivalStar S.A. et al. v. Ford Motor Company, case number 1:10-cv-04359, was filed in the Northern District of Illinois on July 13, 2010.⁶⁵ The complaint in the case asserted Ford infringed the '359 patent via the use of the company's SmartAlert and Crew Chief vehicle tracking systems.⁶⁶

Both the Ford offerings at issue were widely marketed. SmartAlert products provided nationwide online vehicle tracking and security features to aid with stolen vehicle recoveries.⁶⁷ Ford's Crew Chief system was a widely marketed vehicle fleet management tool. It was marketed by Ford as the only fleet management tool capable of accessing proprietary Ford data contained within a vehicle's computers and sharing it via an embedded cellular connection with a fleet owner to maximize fleet operations.⁶⁸ Being directed to broadly marketed products, the patent suit based on the '359

⁶⁴ See *id.*

⁶⁵ For the complete court docket and complaint in this case, see Unified Patents Portal, 1:10-cv-04359 - ArrivalStar S.A. et al. v. Ford Motor Co., <https://portal.unifiedpatents.com/litigation/Illinois%20Northern%20District%20Court/case/1:10-cv-04359> (last visited on 11/15/2020). The complaint in this case also asserted infringement of several other patents in addition to the '359 patent. All but one of these additional patents were also abandoned by their owners as worthless (via the non-payment of maintenance fees needed to keep the patents in force for their full terms). The additionally asserted patents included U.S. Patent No. 6,952,645 (expired year 12), U.S. Patent No. 7,191,058 (expired year 8), U.S. Patent No. 6,804,606 (expired year 12), U.S. Patent No. 6,714,859 (expired year 12), and U.S. Patent No. 6,278,936 (extended to full term). See *id.*

⁶⁶ See *id.*

⁶⁷ See *Inilex Launches New SmartAlert Products for Ford Motor Company Vehicles*, BUSINESS WIRE (Jan. 22, 2009), <https://www.businesswire.com/news/home/20090122005300/en/Inilex-Launches-New-SmartAlert-Products-for-Ford-Motor-Company-Vehicles>.

⁶⁸ See *Ford Crew Chief Telematics System Can Improve Fuel Economy by Up to 20 Percent Through Better Fleet Management*, PNR NEWSWIRE (Jun. 7, 2011), <https://www.pnewsire.com/news->

patent, if successful, threatened Ford with significant marketing disruptions, adverse customer reactions (if existing customers were unable to continue using systems sold by Ford), and large damage liabilities for infringing products already sold.

Fortunately for Ford, the suit did not produce an injunction or significant damage recoveries. ArrivalStar filed a notice of voluntary dismissal on October 4, 2010, and the case was dismissed with prejudice by the judge involved on the same day.⁶⁹ This probably reflected a successful (but confidential) settlement of the case with a fully paid license to Ford covering its activities. ArrivalStar settled most of its related patent infringement suits based on assertions of infringement by vehicle tracking systems.⁷⁰ Most of the settlements in these cases ranged from \$50,000 to \$75,000, effectively “nuisance suit” settlements for many of the large entities like Ford that ArrivalStar pursued.

The irony of such a settlement—not unique to Ford but rather the common end of litigation based on the ‘359 patent—was that the owner of the patent ultimately abandoned it as worthless. The patent lapsed on June 17, 2017 (12 years after issuance) due to non-payment of maintenance fees. The overall arc of patent litigation concerning the ‘359 patent appears, in retrospect, to have been “much ado about nothing.”

Yet, although its owner ultimately thought so little of the ‘359 patent that the owner abandoned it rather than pay modest fees, enforcement of the ‘359 patent had substantial consequences. The judicial and attorney resources used in administering the 470 cases involving this patent were no doubt large. And, assuming that all of these cases settled for amounts near the bottom of the typical settlement range of about \$50,000 to \$75,000 per settlement, the aggregate recoveries based on this abandoned patent may have been substantial. This one abandoned patent may have figured in recoveries of over \$23 million by the patent’s owners.⁷¹

V. Conclusion: Preventing Abuses of Worthless Patents in Large Volume

releases/ford-crew-chief-telematics-system-can-improve-fuel-economy-by-up-to-20-percent-through-better-fleet-management-123299668.html.

⁶⁹ See Unified Patents Portal, 1:10-cv-04359 - Arrival Star SA et al. v. Ford Motor, <https://portal.unifiedpatents.com/litigation/Illinois%20Northern%20District%20Court/case/1:10-cv-04359> (last visited on 11/15/2020).

⁷⁰ See Tanya Snyder, *Patent Troll Sues Transit Agencies For Releasing Real-Time Transit Info*, STREETS BLOG USA (Apr. 16, 2012), <https://usa.streetsblog.org/2012/04/16/patent-troll-sues-transit-agencies-for-releasing-real-time-transit-info/>.

⁷¹ This total recovery estimate was determined by taking the per case settlement figure at the low end of the typical settlement range (\$50,000) and projecting similar recoveries over the 470 cases based on the ‘359 patent. This produces an aggregate recovery estimate of $470 \times \$50,000 = \$23,500,000$. This estimate may understate the aggregate recoveries as it relies on the recovery amount at the lowest end of the typical recovery range.

Patent Litigation

A. The Scope of the Problem

The present study suggests that abusive assertions of worthless patents in large-scale patent litigation involves a small set of massively litigated patents. Most patents in the bottom ninety nine percent of litigated patents were valued by their owners (as evidenced by their willingness to pay maintenance fees needed to extend the patents to full term). These valued patents extended to full terms made up about 80 percent of patents in the bottom 99 percent of litigated patents.

The remaining 20 percent of early expiring patents in the bottom 99 percent of litigated patents do not provide evidence of abusive litigation with extensive impacts. Three factors undercut the significance of litigation based on these early expiring patents. First, these patents are a small portion of the least litigated group, suggesting at most that 20 percent of the least litigated patents may have little or no value. Second, these patents accounted for only a few cases per patent, meaning that the numbers of cases affected by these potentially worthless patents were few. Only 7,834 patent assertions (or about 10 percent of all patent case assertions assessed in the study) resulted from early expiring patents in the bottom 99 percent of litigated patents. Third, some of these early expiring patents may not be worthless; rather, their shortened duration may stem from terminal disclaimers, a feature most often associated with patents that are highly valuable litigation vehicles (due to extended crafting in application processes) rather than worthless patents.

Unfortunately, litigation at the highest volume levels may involve more worthless patents. Twenty-five percent of patents in the top one percent of most litigated patents (asserted in 26 cases or more) expired early and may have been worthless patents. This percentage even higher at higher litigation volumes. For extremely frequently litigated patents (asserted in 85 cases or more), early expiring patents comprised about 40 percent of all patents and a majority of case assertions were based on early expiring patents. Clearly, at the highest litigation levels, early expiring patents are a major feature of large-scale patent litigation.

However, not all of the early expiring patents appearing in large-scale litigation appear to be worthless patents. As previously explained, patents expiring early based on terminal disclaimers are generally part of carefully executed strategies for patent crafting and enforcement. The resulting patents are highly effective in licensing and litigation and correspondingly valuable.

Such patents may raise their own concerns. In part because of their special crafting for litigation, heavily litigated patents with terminal disclaimers may involve their own varieties of litigation abuses. For example, these heavily crafted patents may achieve their litigation and licensing value because they emerge with highly complex patent claims that heighten litigation costs for defendants and promote case settlements to avoid complex litigation regardless of case merits.⁷² Such a process would

⁷² See, e.g., Eric W. Pfeiffer, *Setting Patent Traps*, FORBES.COM (Jun. 24, 2002) (asserting that a

be abusive of itself but is beyond the scope of the evaluations here. For present purposes, heavily litigated patents do not appear to involve extensive assertions of patents admitted by owners to be worthless. Rather, extensive litigation of patents with terminal disclaimers probably reflect just the opposite—that is, extensive litigation follow through on carefully crafted patents believed by their owners to be highly valuable in litigation.

The problem of heavy litigation of worthless patents is therefore confined to a small but important component of heavily litigated patents that both expire early and lack terminal disclaimers. These patents appear to be simply abandoned by their owners as worthless. The numbers of patents involved are small—in the more than two million patents examined in this study, only 28 patents (all within the top one percent of litigated patents asserted in 26 cases or more) were within this suspect group. However, this small group of patents had enormous litigation impacts. Thousands of patent cases were impacted by these few abandoned and apparently worthless patents. The 28 patents figured in 2,098 cases. Comprising about 10 percent of the patents in the top one percent of litigated patents, they accounted for about 13 percent of patent assertions for patents in the top one percent. The 2,098 cases they impacted were about three percent of the 77,257 patent cases evaluated in the study.

The thousands of cases influenced by these apparently worthless patents raise concerns about the integrity of large-volume patent litigation and justify consideration of related reforms. The amplification of ultimately abandoned patents into numerous case assertions involves, at minimum, faulty assessments of patent value before initiating wide-scale litigation and, potentially, intentionally misleading assertions of patent interests known to be worthless. The results are extensive, wasteful expenditures of litigation resources (for both defendants and the patents holders) as well as misplaced litigation threats deterring legitimate commercial activities. The scope of these negative impacts suggests that reforms to diminish mass-scale litigation of later abandoned patents are in order.

B. Reform Strategies

Targeted approaches to reducing high-volume patent litigation based on worthless patents might either 1) discourage decisions to heavily litigate patents lacking clear indicators of probable value, or 2) accelerate to early points in litigation actions that are likely to clarify that patents are worthless, thereby promptly cutting off further litigation proceedings and costs based on the worthless patents. These two approaches have the shared advantage of minimizing waste of resources on patent suits premised on abandoned patents. They will also tend to shorten the period in which worthless patents remain as apparent threats to legitimate commercial activities. The remainder of this article will suggest some potential reforms within these two frameworks.

patent litigant pressing a few patents with complex claims was using the complexity to promote settlements regardless of the merit of the suits involved), https://www.forbes.com/asap/2002/0624/065_print.html.

1. *Influencing Decisions to Litigate*

Changes in patent standards can give patent owners a greater stake in avoiding mass-scale litigation of ultimately abandoned patents. By signaling that this type of litigation will have adverse consequences, patent standards can encourage patent owners to avoid such litigation. How they do so (that is, with what combination of information gathering, litigation aggression, and risk taking) will still be up to individual patent owners.

The aim of this type of reform will be legal standards diminishing the value of litigation in situations where heavily litigated patents are later abandoned or rendered unenforceable (thereby making the patents were worthless). When patent owners decide on litigation—and particularly decide on the numbers of cases in which to assert particular patents—the owners will be encouraged to commit to heavy litigation of only those patents with strong indications of probable value. Changes forcing patent owners to bear more of the risks of mass-scale patent litigation based on worthless patents will tend to adjust the relevant decision processes towards more thoughtful consideration and confirmation of probable patent value before commitments to large-volume patent litigation are made.

Changes made to deter large volume litigation of worthless patents might include:

- 1) *Fee shifting for all cases in which patents are asserted in numerous cases but later abandoned or found invalid*

This reform would put the risk on patent owners of litigation process costs where low value patents are pressed in large volume litigation involving numerous defendants and widespread commercial impacts.⁷³ While shifting the costs of litigation to losing patent owners may not be appropriate in all patent cases, high-volume litigation presents special fee shifting considerations. The enormous litigation impacts that patent owners can impose via highly litigated patents suggests that cases based on these patents deserve distinctive treatment. Where a patent owner chooses to heavily litigate a patent – for example, by asserting a single patent in 26 cases or more and thereby putting the patent into the top one percent of litigated patents—the owner creates especially high litigation risks warranting special fee shifting treatment for the party initiating the mass-scale litigation and raising these unusual risks. Where a patent owner chooses to create high risks of litigation waste, he or she should be prepared to back his or her action by bearing relevant litigation costs where the owner has asserted a worthless patent. Fee shifting limited to highly litigated patents will achieve a proper balancing of heightened risks of litigation waste in mass-scale patent

⁷³ Fee shifting in patent cases is presently authorized by patent statutes. *See* 35 U.S.C. § 285 (providing that a “court in exceptional cases may award reasonable attorney fees to the prevailing party” in patent litigation). The present proposal can be implemented within these statutory provisions by establishing a presumption that cases in which ultimately abandoned or invalidated patents are asserted against large numbers of defendants are exceptional cases warranting fee shifting in the absence of highly unusual circumstances indicating otherwise.

litigation with heightened patent owner responsibility for litigation fees and costs. It will also have the favorable effect of promoting closer attention to patent value before particular patents are asserted in widely filed cases.

- 2) *Compelling patent holders to return all related royalties and damage recoveries when highly litigated patents are later abandoned or rendered invalid*

While the generally prevailing rule in patent enforcement is that patent royalties and damage amounts recovered prior to the lapsing or invalidation of a patent are not recoverable by parties who previously paid these amounts,⁷⁴ this rule might be reversed for heavily litigated patents. A patent holder initiating an extremely broad set of cases derived from a particular patent would be sent the message that any recovery from such a course would depend on the continued enforceability of the underlying patent. This would, in turn, encourage careful assessment of enforceability before initiating large-volume litigation. This type of change might be implemented by recognizing a new form of claim allowing parties who previously paid royalties or judgment amounts based on enforcement of heavily litigated but ultimately abandoned or unenforceable patents to force patent holders to return these amounts. Alternatively, a more efficient form of this reform might be implemented by judicial orders compelling returns of such payments in conjunction with rulings invalidating the relevant patents.

2. *Accelerating Patent Validity Determinations in Litigation*

A second category of changes might reduce the impacts of mass-scale litigation based on worthless patents by identifying cases of this type early in litigation processes. Early identification would cut off some of the associated waste of litigation resources and commercial impacts from threatened injunctive relief and infringement liability. Potential changes of this type include the following.

- 1) *Automatically channeling large numbers of cases asserting one patent into coordinated litigation processes through multi-district litigation (MDL) procedures*

Early stages of patent cases can be coordinated by gathering the cases together through multidistrict litigation procedures. Congress established the Judicial Panel on Multidistrict Litigation to transfer “civil actions involving one or more common questions of fact” to a single “district for coordinated or consolidated pretrial proceedings.”⁷⁵ Patent cases are subject to this multidistrict litigation (“MDL”) process provided that they involve common questions of fact.⁷⁶ The Judicial Panel on

⁷⁴ See, e.g., *Troxel Mfg. Co. v. Schwinn Bicycle Co.*, 465 F.2d 1253, 1257–59 (6th Cir. 1972).

⁷⁵ 28 U.S.C. § 1407(a), (d).

⁷⁶ For descriptions of some of the advantages and implications of coordinated multi-district litigation in patent cases, see Jamie McDole & Michael Karson, *MDL Proceedings as a Tool to Manage Patent Cases After TC Heartland*, IP WATCHDOG (Jun. 14, 2017), <https://www.ipwatchdog.com/2017/06/14/mdl-proceedings-manage-patent-cases-tc-heartland/id=84446/>.

Multidistrict Litigation often concludes that cases present common questions of fact when multiple defendants attack the validity or enforceability of a particular patent.⁷⁷ Where large numbers of cases hinge on the validity of a single patent, the advantages of a single set of proceedings regarding patent validity are particularly great. The involvement of a large number of cases and defendant interests turning on the validity of a particular heavily litigated patent should create a presumption that referral for coordinated MDL processing is appropriate in all high-volume patent litigation.

The advantage of this approach is that, once cases are organized in this manner, it should be possible to develop discovery materials and case records that enable prompt patent validity findings in subsequent case proceedings. These records will help courts identify unenforceable patents (or portions of patents) affecting multiple cases and to eliminate some or all of the associated litigation threats for multiple defendants as early as possible.

2) *Mandating enforceability testing of heavily litigated patents via referrals to the PTAB*

Challenges to patent validity can sometimes proceed more quickly outside of litigated cases. Quick challenges should be promoted for heavily litigated patents since early invalidation of such patents has particularly important consequences in light of the many cases at stake. As part of the America Invents Act (“AIA”), Congress provided for patent validity challenges via inter partes reviews (“IPR”).⁷⁸ In IPR proceedings, the Patent Trial and Appeal Board (“PTAB”) can review the patentability of advances covered by issued patents. By providing expedited opportunities for such reviews, IPRs are intended “to create a timely, cost-effective alternative to litigation.”⁷⁹

Present patent litigation procedures permit cases to be stayed pending the outcomes of referrals of patents to the PTAB for post-issuance challenges to patent validity.⁸⁰ Courts are not required to stay cases in this manner but may realize significant

⁷⁷ *See id.*

⁷⁸ *See* 35 U.S.C. §§ 311–19.

⁷⁹ *Changes to Implement Inter Partes Review Proceedings, Post-Grant Review Proceedings, and Transitional Program for Covered Business Method Patents*, 77 F. Reg. 48680-01 (Aug. 12, 2012) (codified at 37 C.F.R. §§ 42.100 et seq.).

⁸⁰ One group of commentators described the relevant standards governing these stays as follows:

IPRs often occur in parallel with district court patent litigation on the same patent, and district courts must decide whether to proceed with a case when the patent-in-suit becomes the subject of an IPR. Each district court has the inherent power to manage its docket by staying its proceedings pending IPR. Although the test varies by jurisdiction, district courts typically consider three factors when determining whether to stay pending IPR: (1) “whether discovery is complete and whether a trial date has been set;” (2) “whether a stay will simplify the issues in question and trial of the case;” and (3) “whether a stay would unduly prejudice or present a clear tactical disadvantage to the non-moving party.” [*Drink Tanks Corp. v. Growlerworks, Inc.*, No. 3:16-cv-410-SI, 2016 WL 3844209, at *2 (D. Or. July 15, 2016).]

Jason E. Stach & Benjamin A. Saidman, *Maximizing the Likelihood of a Litigation Stay Pending Inter Partes Review*, IP LITIGATOR (Sept./Oct. 2016),

benefits from relying on PTAB results before embarking on equivalent judicial proceedings. Procedures in the PTAB offer quick reviews of patent validity by parties who are expert in both patent law and types of evidence generally presented to challenge patent validity. These sorts of validity reviews offer particularly important advantages where particular patents are used in multiple cases to establish broad liability against numerous defendants. Costs of allowing litigation to continue longer than necessary are magnified where numerous parties are threatened by large volume patent litigation. PTAB proceedings may be the quickest and most accurate means to gain relevant rulings on the likely validity of patents at the root of these multi-party threats. PTAB reviews should be encouraged by defendants in large volume patent litigation and associated case stays should be presumptively granted. A stronger reform along these lines would require courts to compel patent owners pressing widely litigated patents to submit the patents to PTAB reviews prior to continuation of cases to infringement determinations.

3) *Front-loading validity findings in case proceedings based on heavily litigated patents*

In cases based on heavily litigated patents, trial courts have discretion to determine when in the proceedings patent validity issues are determined. Means to shift validity determinations early in trials include court management of discovery processes and court hearings to place summary judgment rulings addressing validity as early in court proceedings as possible.⁸¹ Shifting patent validity challenges to the earliest possible stages in these trials would be advantageous as this acceleration would offer means to cut off mass-scale litigation based on unenforceable patents—and the associated threats against numerous defendants—at the earliest possible stages. While acceleration of validity determinations for this purpose should not be imposed in ways that cut off advantageous discovery or otherwise prejudice the interests of defendants in particular cases, the public interest in cutting off groundless yet widespread patent litigation will encourage judicial attention to speedy patent validity determinations in large volume patent cases where there is no clear evidence that litigant prejudice will result.

C. The Need for Continuing Scrutiny and Reform at the Extremes of Patent Litigation

Changes such as these are likely to diminish the likelihood and scope of large volume patent litigation based on worthless patents. The sufficiency of these types of changes to prevent repetitions of past wasteful litigation based on worthless patents can only be determined through ongoing scrutiny of high-volume patent litigation and the impacts of reforms. High-volume patent cases based on a few patents appear to

<https://www.finnegan.com/en/insights/articles/maximizing-the-likelihood-of-a-litigation-stay-pending-inter.html>.

⁸¹ For considerations governing the timing of summary judgement rulings in patent cases, see Federal Judicial Center, PATENT CASE MANAGEMENT JUDICIAL GUIDE §§ 6.1–6.2 (3d ed. 2016), https://www.fjc.gov/sites/default/files/2017/PCMJG3d_2016_final.pdf.

be a distinctive type of litigation in which both heavily crafted patents (with terminal disclaimers) and ultimately abandoned patents play key roles. Because thousands of patent cases—and associated commercial and societal disruptions—are at stake in high-volume cases, litigant practices in high-volume cases deserve ongoing monitoring and analysis. Practices at these extremes of patent litigation have outsized consequences in case filings and litigation threats. These consequences (and impacts of any related reforms) deserve equally outsized attention from courts, litigants, academics and others interested in patent litigation and its impacts on innovation, commerce, and society.