

"Pride in Patent Ownership: The Value of Knowing Who Owns a Patent"

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Chairman Leahy, Ranking Member Tillis, members of the Subcommittee: thank you for inviting me to testify on the importance of startups and small businesses knowing who owns U.S. patents.

Engine is a non-profit technology policy, research, and advocacy organization that bridges the gap between policymakers and startups. Engine works with government and a community of thousands of high-technology, growth-oriented startups across the nation to support the development of technology entrepreneurship through economic research, policy analysis, and advocacy on local and national issues.

The U.S. patent system is rooted in public disclosure, and Engine applauds you for promoting better access to information about who owns and controls those assets. Startups stand to benefit when others know, with confidence, that they own high-quality patents. But right now, there's a troubling gap in knowledge around patent ownership which has opened doors to types of abuses that disproportionately harm startups and small businesses. Companies looking to game the patent system can conceal ownership or hide behind shell companies, which facilitates abusive assertion campaigns and insulates against liability. And—as with everything in the patent system—it is vital that Congress account for all stakeholders, including startups that only interact with the system when they are accused of infringement, end-users of technology, and the broader public. Greater transparency around patent ownership is a crucial part of addressing this public interest.

As discussed below, Engine believes transparency around patent ownership is important for at least four reasons: it would (1) reduce transaction costs and wasteful legal spending; (2) discourage abusive practices; (3) equip startups with valuable information to defend against frivolous cases, and (4) inform evidence-based, data-driven innovation policy.

Disclosure is a pillar of the U.S. patent system. Today's hearing marks the latest in a series of calls from government, the private sector, and academics for greater transparency around patent ownership. Public notice is central to the bargain of our patent system: the government grants patents in exchange for inventors adequately disclosing inventions to the public. In other areas of the law where similar principles apply (like copyright and trademark), there are already incentives for rightsholders to register their ownership. Patent ownership should not be an exception. As Rachael Lamkin, an IP attorney with almost two decades of experience representing early-stage tech companies and small businesses, put it: "When someone starts a company, we get to see who owns it. A company incorporated in Delaware has to register there and we get to see things like who the members of the LLC are. It is a very odd thing that you have owners of a government granted patent right, yet no one can see who owns it."

Startups benefit when others know that they own high-quality patents. High-quality patents can be a vital asset for certain high-tech, high-growth startups,⁶ and there are many ways the startup patent owner derives value from letting the public know about the patents it owns. Especially depending on the industry, many early stage companies will use patents to attract investors, enhance their reputation in the market, signal unique or superior features to customers, and/or improve prospects for exit.⁷ Public information about patent ownership advances those goals, and startups using patents to protect themselves in the market will want the public (including, e.g., potential business partners and competitors) to know what they own.

1

¹ See, e.g., The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition, Fed. Trade Comm'n 129-31 (Mar. 2011) (discussing how parties often fail to report patent assignments to PTO, and suggesting a statutory change to require filing and public recordation of patent assignments); Nathan P. Anderson, Note, Striking a Balance: The Pursuit of Transparent Patent Ownership, 30 Berkeley Tech. L.J. 395 (2015) (summarizing administrative and legislative consideration); Erica S. Mintzer & Suzanne Munck, The Joint U.S. Dept. of Justice and Fed. Trade Comm'n Workshop on Patent Assertion Entity Activities— 'Follow the Money," 79 Antitrust L.J. 423, 432-35 (2014) (summarizing harms from insufficient or opaque information on ownership).

² See, e.g., Mintzer, supra note 1 (citing comments from, e.g. Microsoft, National Restaurant Association, and MetroPCS); Anthony Trippe, Will New Register Solve the Issue of Transparency in Patent Ownership?, Patinformatics, https://www.patinformatics.com/blog-posts/will-new-register-solve-the-issue-of-transparency-in-patent-ownership (last visited Oct. 15, 2021) (discussing need for transparency and private sector effort to create register).

³ See, e.g., Robin Feldman, Transparency, 19 Va. J.L. & Tech. 271 (2014).

⁴ See, e.g., Robert A. Matthews, Jr., 1 Annotated Patent Digest §§ 1:1, 1:2 (2021).

⁵ Robert P. Merges et al., Intellectual Property in the New Technological Age 796-97 (5th ed. 2010) (describing trademark registration); *Copyright Basics*, U.S. Copyright Office 4-6 (Sept. 2021), https://www.copyright.gov/circs/circ01.pdf (discussing copyright registration).

⁶ Engine has articulated similar positions in the past. E.g., Startups & the U.S. Patent System: Prioritizing Quality and Balance to Promote Innovation, Engine (July 2021), https://www.engine.is/news/category/prioritizing-quality-and-balance-to-promote-innovation.

⁷ See, e.g., Stuart J.H. Graham et al., High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey, 24 Berkeley Tech. L.J. 1255, 1256 (2009) (reporting on survey of entrepreneurs); Edward Graham, #StartupsEverywhere Profile: Alex Kuklinski, Founder, fyiio, Engine (Apr. 24, 2020), https://www.engine.is/news/startupseverywhere-lincoln-neb ("Advice-wise, I would say do some research and talk to other founders who have gotten patents. Find out what it was like for them. Find out why they pursued a patent or why they didn't, and understand the costs involved up front. While I had some hesitations up front . . . I think it is nice to say we have some legal protections with the patents."); What We Heard From the Founders About Startups & Patent Policy, Engine (July 23, 2021), https://www.engine.is/news/category/what-we-heard-from-the-founders-about-startups-amp-patent-policynbsp (startup executive describing patented features that are "part of how we deliver on our mission").

On the other hand, a void of accurate patent ownership information increases transaction costs and burdens for startups and small businesses who need to know about the patents that pertain to their work. Every startup in the country is deemed to be on notice of over 3 million active U.S. patents, 8 with 350,000 more issuing each year; 9 that creates a vast and complex web for companies to wade through to try and avoid (alleged) infringement. When it comes to patent clearance, licensing, demand letters, and litigation, the details of who owns what are critical. 10 Indeed, as Jean Anne Booth, CEO of UnaliWear, an Austin-based medtech startup that advances safety and independence for vulnerable populations recently told me: "I thought you had to register your patent ownership, and frankly I do not see why you should be able to not do it. The whole purpose of patents is that you are putting information out there so others can learn from it, build from it, license it. You could actually reach out to someone with a patent and tell them 'I want to pull in your great idea to the work I am doing,' as opposed to waiting for them to find and sue you. I have done that before in the semiconductor space."

Abusive patent litigants can do more damage when they conceal information about patent ownership and control, which is particularly detrimental to startups. Companies have found ways to misuse the patent system: instead of trying to adjudicate legitimate claims of infringement, some try to coerce startups into settling frivolous assertions for less than the cost of litigation. And the lack of transparency around patent ownership adds layers to that problem.

First, if you are acting in good faith there is no reason to operate in the shadows. However, hiding behind shell companies enables—and has increasingly become a characteristic of—abusive patent assertion. ¹¹ Indeed, patent assertion entities (PAEs) (also referred to as "patent trolls") routinely find ways to conceal patent ownership or obscure who controls a patent assertion campaign.

A few examples can illustrate how hiding a patent's true owner helps those gaming the system to the detriment of startups and small businesses. In 2012, Project Paperless was sending patent letters to small businesses across the country. On the theory that anyone infringed if they used an off-the-shelf scanner to email a PDF, Project Paperless was demanding about \$1,000 per employee. This sort of campaign can be profitable and low risk because there are a lot of targets, and they cannot afford to challenge the accusation in court which increases the odds they will just pay to settle and avoid costly litigation.

⁸ Cf. Matthews, supra note 4, § 9:3 (discussing patent infringement as a strict liability offense, noting "[a]ccidental or innocent direct infringement is still infringement"); Erin Duffin, Number of Patents in Force in the United States from 2004 to 2019, Statista (Jan. 28, 2021), https://www.statista.com/statistics/256738/number-of-patents-in-force-in-the-us ("[i]n 2019, there were about 3.13 million patents in force in the United States").

⁹ U.S. Patent Activity, Calendar Years 1790 to the Present, U.S. Patent and Trademark Office (Oct. 17, 2021), https://www.uspto.gov/web/offices/ac/ido/oeip/taf/h counts.htm.

¹⁰ E.g., Brian T. Yeh, Cong. Research Serv., R42668, *An Overview of the "Patent Trolls" Debate* 12 (2013) (notice is necessary for the system to work efficiently, allowing "people to avoid infringement" and "negotiate permission to use others' IP").

¹¹ Engine has articulated similar positions in the past. *E.g.*, Comments of Engine Advocacy, *In re* Changes to Require Identification of Attributable Owner, Docket No. PTO-P-2013-0040, at 3 (Apr. 24, 2014), https://www.uspto.gov/sites/default/files/documents/comments attributable owner2014.pdf#ao-a engine 20140424.

But once a few companies in Atlanta realized they were in the same boat they decided to fight back and websites like "Stop Project Paperless" popped up—providing details about the assertion campaign, the lawyers behind it, potential prior art, and a call to action. ¹² From then on, someone who received a demand letter from Project Paperless was only a few clicks away from learning these were dubious accusations. This understandably hurt Project Paperless's prospects of extracting settlements.

Project Paperless "unloaded its patents to a newly created holding company called MPHJ Technologies," which is a name many of us are likely familiar with by now.¹³ And it underwent a dramatic transformation, with MPHJ establishing scores of shell companies. Instead of getting a letter from MPHJ or Project Paperless, now small businesses were hearing from AccNum, AdzPro, GosNel, ¹⁴ InterPar, DreOcc, BilOlt, etc.¹⁵ According to the FTC, MPHJ was using 81 different subsidiaries to assert its scanner patents, and it sent approximately 16,465 letters to small businesses located in all 50 states.¹⁶ While public awareness and a few small businesses pushing back would make it harder for this campaign to continue under the Project Paperless name, with dozens of new names, the same patents and accusations could carry on.

Many companies have taken pages out of that same book, including massive hedge funds and investors that are funding PAEs and creating shell companies for patent assertion today. For example, by now many of us recognize the name IP Edge, but if you were a startup that got a demand letter from Swirlate,¹⁷ Nimitz Technologies,¹⁸ or Kevique Technology,¹⁹ you might not realize that a well-known and well-resourced PAE was targeting you. And anonymity is enabling the shift we are seeing to more PAEs with deep-pockets behind them—which has also caused a shift to more aggressive assertion tactics that prioritize volume and disregard the merits.²⁰ Indeed, Rachael Lamkin recently explained: "It used to be that plaintiff's firms investigated the merits before filing a patent suit, and if a case was weak on the merits they wouldn't take it. Now that hedge funds are

¹² The Patents, Stop Project Paperless (Mar. 8, 2013), https://web.archive.org/web/20130308010738/http://stop-project-paperless.com/the-patents/; see also, e.g., Mike Masnick, Patent Troll Shell Companies Shake Down Small Businesses for \$1k Per Employee for Using Network Scanner, Techdirt (Jan. 2, 2013),

https://www.techdirt.com/articles/20130102/08174721543/patent-troll-shell-companies-shake-down-small-businesses-1k-per-employee-using-network-scanner.shtml.

¹³ Joe Mullin, *Patent Trolls Want \$1,000—for Using Scanners*, ArsTechnica (Jan. 2, 2013), https://arstechnica.com/tech-policy/2013/01/patent-trolls-want-1000-for-using-scanners/.

¹⁴ Id

¹⁵ In re MPHJ Tech. Investments LLC, Docket No. C-4513, at 4 (F.T.C. Mar. 17, 2015), https://www.ftc.gov/enforcement/cases-proceedings/142-3003/mphj-technology-investments-llc-matter (complaint). ¹⁶ Id.

¹⁷ Joe Mullin, New Low for a Bad Patent: Patent Troll Sues Ventilator Company, Elec. Frontier Found. (May 20, 2020), https://www.eff.org/deeplinks/2020/05/new-low-bad-patent-patent-troll-sues-ventilator-company (discussing connection between IP Edge and Swirlate).

¹⁸ IP Edge Launches Another Campaign in Wake of Recent Portfolio Pickup from France Brevets, RPX Insight (Aug. 30, 2021), https://insight.rpxcorp.com/news/67821-ip-edge-launches-another-campaign-in-wake-of-recent-portfolio-pickup-from-france-brevets (discussing IP Edge campaign of lawsuits filed by Nimintz).

¹⁹ Jonathan Stroud, *Miles to Go Before We Sleep*, Regulation 48, 51 (Spring 2018) https://www.cato.org/sites/cato.org/files/serials/files/regulation/2018/3/regulation-v41n1-3.pdf (listing several IP Edge entities).

²⁰ See, e.g., Abby Rives, Opinion, Fortress Patent Fight Shows Abusive Litigation Hurts Startups, Law360 (Mar. 25, 2020), https://www.law360.com/articles/1256250.

investing, there's no longer that incentive to not file bad cases." Knowing who is behind those assertions is useful, in the court of public opinion and beyond.

Second, concealing patent ownership helps PAEs avoid liability for vexatious behavior. For example, in exceptional cases courts can order patent plaintiffs to reimburse a defendant's fees.²¹ This is, at least in part, designed to deter abusive litigation as fee shifting means a plaintiff faces some risk when it litigates a very weak case in an unreasonable manner.²² But if the plaintiff is a shell company without any assets, it can effectively become judgment proof.²³ That frustrates (or entirely defeats) a defendant's ability to recover the money it is owed and the judiciary's ability to deter abusive litigation. Overall, this creates an environment where startups have a harder time justifying the expense of a meritorious defense, since they probably cannot recover fees, and can make PAEs effectively immune from the fee shifting designed to keep them in line.

Likewise, Vermont and North Carolina are among many states that have passed laws to combat abusive patent assertion, but those only work if you can see who is violating the law.²⁴ The State of Vermont received complaints from businesses and nonprofits targeted by MPHJ, which prompted it to file suit.²⁵ And a North Carolina packaging company is currently suing Landmark alleging baseless assertion of infringement against it and other small companies,²⁶ with amicus support from several other companies and North Carolina business associations.²⁷ That case, and a related one in Washington, come after a recent 18-month period where Landmark sent "1,892 separate patent assertion demand letters to 1,176 different target companies in 48 states"—averaging more than 25 letters per week.²⁸

However, suits under these state laws are only possible when we have learned enough about the entities to see problematic patterns. And shielding patent ownership is valuable to a PAE looking to evade liability under these laws.

²² Abby Rives, Blackbird v. Health in Motion, Attorney Fees, and What it Means for Startups, Engine (Jan. 9, 2020), https://www.engine.is/news/ip-recap-010920 (discussing fee award in Blackbird v. Health in Motion, 944 F.3d 910 (Fed. Cir. 2019)).

²¹ 35 U.S.C. § 285.

²³ See, e.g., Brian T. Yeh & Emily M. Lanza, Cong. Research Serv., R43979, Patent Litigation Reform Legislation in the 114th Congress 17 (2015) (quoting Examining Recent Supreme Court Cases in the Patent Area: Hearing Before the House Judiciary Comm., Subcomm. on Courts, Intellectual Prop., and the Internet, 114th Cong., 1st Sess. (2015) (Statement of Andrew J. Pincus, Partner, Mayer Brown LLP), at 3).

²⁴ E.g., Matthew Bultman, State Laws Fighting Patent System's 'Dark Underbelly' Put to Test, Bloomberg Law (June 15, 2021), https://news.bloomberglaw.com/ip-law/state-laws-fighting-patent-systems-dark-underbelly-put-to-test; Patent Trolling, Office of the Vermont Attorney General, https://ago.vermont.gov/patent-trolling/ (last visited Oct. 15, 2021); Blake Brittain, N.C. Federal Court Upholds State's Anti-Patent Troll' Law, Reuters (Aug. 20, 2021), https://www.reuters.com/legal/transactional/nc-federal-court-upholds-states-anti-patent-troll-law-2021-08-20/.

²⁵ Vermont, *supra* note 24 (the MPHJ case was filed under consumer protection, not patent-specific, law).

²⁶ North Carolina, *supra* note 24.

²⁷ 21-025 - Napco, Inc. v. Landmark Technology A, LLC, GovInfo, https://www.govinfo.gov/app/details/USCOURTS-ncmd-1 21-cv-00025 (last visited Oct. 17, 2021) (listing amici Acushnet, Garmin Int'l, North Carolina Chamber Legal Institute, North Carolina Retail Merchants Assoc., North Carolina Tech. Assoc., Red Hat, SAS Institute, and Symmetry).
²⁸ State of Washington v. Landmark Tech. A, LLC, No. 21-2-06348-5 SEA, at 2 (May 13, 2021), https://apportal-s3bucket.s3.amazonaws.com/001 StampedComplaint.pdf (complaint).

Third, lack of clarity in patent ownership creates protracted headaches around standing, which drives litigation costs higher and further out of reach for startups. Patent litigation is notoriously expensive; defending even a lower-stakes PAE case costs about \$1.875 million.²⁹ By contrast, the average seed-stage startup raises \$1.2 million—a sum that is expected to cover all its costs (e.g., payroll, R&D, marketing) for nearly two years.³⁰ And since the vast majority of startups do not, or do not yet, have outside funding, most have far less money than that.

Opaque patent ownership makes things worse because a startup defending a frivolous infringement claim also has to sort out whether the alleged patent owner (a) actually owns the patent and (b) has standing to sue. This would force the startup to spend tens of thousands of dollars just on discovery and litigation related to standing. Given that choice, many will understandably opt to settle a case and pay a purported patent owner who has failed to show it really has the right to sue in the first place. Indeed, Uniloc—another investment-backed PAE with a history of filing over 600 lawsuits, including many against startups and smaller businesses³¹—spent two years litigating its standing to sue Apple.³² While Apple can afford that fight, startups cannot.

Better data about patent ownership would curb abuse and give startups information they need. Bringing greater transparency to the patent system would constrain the number of games that can be played. But ownership information would not only combat bad behavior, it would equip startups with powerful information about who is suing, what patents they control, and where the money comes from.

As Ken Carter, General Counsel at cloud-based, video technology startup Bitmovin, recently told me: "We got our first patent troll case in 2018. An essential element to our defense strategy was knowledge of the non-practicing entity's full patent portfolio. While we did our homework, the truth is that we got lucky, because by chance we interviewed an attorney who knew the owner behind the LLC suing us—this attorney had litigated against a different LLC controlled by the same person. Being able to link the two entities gave us what we needed to respond in a way that got the lawsuit almost immediately dismissed—further evidence of the low-quality nature of the assertion." Bitmovin's CEO, Stefan Lederer, added: "If that lawsuit had come 6 months earlier or 18 months later in the middle of a fundraise, it could have been an end-the-company event because no venture capitalist wants to invest in a company being extorted by trolls."

That said, knowing who owns which patents will be necessary, but not sufficient, to help solve the problems of abusive litigation. On the transparency front, startups defending against frivolous

²⁹ Am. Intellectual Prop. Law Ass'n, 2019 Report of the Economic Survey 51 (2019) (reporting costs of litigation).
³⁰ The State of the Startup Ecosystem, Engine 17 (2021), https://engineis.squarespace.com/s/The-State-of-the-Startup-

³⁰ The State of the Startup Ecosystem, Engine 1/ (2021), https://engineis.squarespace.com/s/The-State-of-the-Startup-Ecosystem.pdf.

³¹ See, e.g., Rives, supra note 20; list of cases available at Unified Patents Portal, https://portal.unifiedpatents.com/litigation/caselist?flag=DC&flag=ITC&plaintiff=Uniloc+USA%2C+Inc.&plaintiff=Uniloc+Luxembourg+Sa&plaintiff=Uniloc+2017+LLC&plaintiff=Uniloc+Licensing+USA%2C+LLC&plaintiff=Uniloc+Singapore+Private%2C+Ltd.&sort=-filed_date (last visited Oct. 18, 2021).

³² Uniloc USA, Inc. v. Apple, Inc., 508 F. Supp. 3d 550, 552 (N.D. Cal. 2020) (citing order concluding Uniloc lacked standing to sue); Uniloc 2017 LLC v. Apple, Inc., 964 F.3d 1351, 1354-57 (Fed. Cir. 2020) (discussing procedural history).

assertions would also benefit from knowing things like: who has the right to assert the patent(s), who is controlling the assertion campaign, and where is the money flowing?

Better data about U.S. patent ownership would also support evidence-based and data-driven innovation policy. Beyond this Subcommittee's jurisdiction, there are numerous ways Congress seeks to craft policy to promote domestic innovation. And oftentimes, policymakers and researchers end up looking at U.S. patent data as an (admittedly imperfect) proxy for innovation.³³ On that score, having better patent ownership data is also necessary.

For example, in setting research funding priorities, Congress sometimes looks to patent data. The Innovation Centers Acceleration Act would designate nine metropolitan areas in the U.S. as innovation centers that would receive substantial grants from the National Science Foundation, small business loans, and new tax credits.³⁴ To select those nine regions, the bill proposes looking at the number of patents issued to residents of a region—which means that for the government to decide where to invest these federal dollars, it needs to figure out who owns what patents and where they are located.

Data about foreign ownership of U.S. patents could also help answer policy-relevant questions. We know that 53 percent of the U.S. utility patents granted last year went to foreign applicants.³⁵ But without accurate ownership and assignment data, we may not know who owns or controls those patents or which U.S. patents have been assigned to foreign entities—data that could help inform innovation policy.³⁶ Likewise, as shell companies owned by foreign entities assert patents against U.S. firms,³⁷ there could be consequences for domestic companies and innovation. But to investigate that, we would need to first know who owns what.

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³³ See, e.g., Petra Moser, Patents and Innovation: Evidence from Economic History, 27 J. Econ. Perspectives 23, 23-24 (2013) (noting that "[i]n the absence of economy-wide data on the quantity of innovations, patent counts have become the standard measure of innovation," yet patent data "may fail to capture innovation that occurs outside of the patent system").

³⁴ Innovation Centers Acceleration Act, S. 871, 117th Cong. (2021), https://www.congress.gov/bill/117th-congress/senate-bill/871.

³⁵ Patent Counts By Origin and Type, Calendar Year 2020, U.S. Patent and Trademark Office (Oct. 17, 2021), https://www.uspto.gov/web/offices/ac/ido/oeip/taf/st_co_20.htm (with country of patent origin determined according to first named inventor).

³⁶ See, e.g., Abby Rives, A Brief Case Study: The Shortcomings of Counting Patents by Country to Inform Patent Eligibility in the U.S., Medium (Oct. 13, 2021), https://engineadvocacyfoundation.medium.com/a-brief-case-study-in-policy-relevant-empirical-assessments-the-shortcomings-of-counting-patent-444acf13195f.

³⁷ See, e.g., Jacob Schindler, Korean NPE Launches Offensive After Streaming Pool's Collapse, IAM (Nov. 12, 2019), https://www.lexology.com/library/detail.aspx?g=8a51441a-4ce1-4cf4-a4fb-5fb922e2be39; SynKloud Continues to Collect Patents, as Microsoft Files for a Declaratory Judgment Action in Delaware, RPX Insight (Jan. 4, 2020), https://insight.rpxcorp.com/news/59869-synkloud-continues-to-collect-patents-as-microsoft-files-for-a-declaratory-judgment-action-in-delaware; SynKloud Techs. Patent Held Unpatentable, Unified Patents (Mar. 8, 2021), https://www.unifiedpatents.com/insights/2021/3/8/synkloud-technologies-patent-held-unpatentable; SynKloud Techs., LLC v. Adobe, Inc., No. 20-1211 (U.S.) (petition for writ of certiorari, identifying IdeaHub as parent of SynKloud).

To sum up with another reflection from Ken Carter, "This is the type of law we needed three years ago. If the Constitutional quid pro quo behind Article I, Section 8, Clause 8 is the grant of patent rights in exchange for the disclosure of information which would not otherwise be part of the wealth of human knowledge, it would seem axiomatic that society should know who is the counterparty to that bargain. This information would give us some of the tools we need to protect ourselves from low-quality patent assertions."

Thank you again for inviting me to testify today about the value of knowing who owns U.S. patents. We know that the Subcommittee's work—from bringing greater transparency to the patent system, to improving patent quality and seeking greater diversity in innovation³⁸—will be an ongoing process. Engine is eager to contribute to that work and we hope you will continue to give startups and small businesses a seat at the table.

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³⁸ See, e.g., Press Release, Leahy And Tillis Introduce Bipartisan Bills To Boost American Innovation (Sept. 21, 2021), https://www.leahy.senate.gov/press/leahy-and-tillis-introduce-bipartisan-bills-to-boost-american-innovation (introducing Unleashing American Innovators Act); Improving Access and Inclusivity in the Patent System: Unleashing America's Economic Engine, Hearing Before the Subcomm. on Intellectual Property of the S. Comm. on the Judiciary, 117th Congress (2021); Protecting Real Innovations by Improving Patent Quality, Hearing Before the Subcomm. on Intellectual Property of the S. Comm. on the Judiciary, 117th Congress (2021).