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Patent Nationalism and the Case for a New U.S. Patent Working Requirement

Timothy T. Lau*

A working requirement is a provision of intellectual property law that uses the threat of punishment to encourage holders to “work” their intellectual property. This Article examines the case for adding a working requirement to U.S. patent law. It explains that, given the current global trends in economic and technological development, a working requirement that increases the exposure of Americans to new technologies through the manufacture of inventions is necessary for the U.S. patent system to fulfill its constitutional purpose, specifically, “[t]o promote the Progress of Science and Useful Arts.” To that end, this Article analyzes elements of working requirements in foreign patent laws to identify specific features that should be incorporated within a new U.S. working requirement. It also addresses how to structure the working requirement to prevent potential abuse and presents a law and economics analysis as to how the requirement can be used to encourage manufacturing in the United States.

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* The author is a member of the Research Division of the Federal Judicial Center. The views expressed in this Article are of the author alone and do not represent the views of the Federal Judicial Center. The author thanks Professors Mark Lemley, Sapna Kumar, Shubha Ghosh, Douglas Lichtman, and Pilar Ossorio as well as the commenters at the author’s presentation at PatCon 7 for their helpful suggestions. The author also thanks the editors of the *BYU Law Review* for their many useful and insightful comments.

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I. INTRODUCTION

A patent is the grant of a monopoly over an invention. But a patent represents a *quid pro quo*. As the Supreme Court has explained, “The grant of an exclusive right to an invention was the creation of society—at odds with the inherent free nature of disclosed ideas—and was not to be freely given.”¹ In subjecting a patent monopoly over itself, the public gets something in return.

What the public should receive in return is a subject of endless debate. However, there has not been an urgent need in recent times to deeply examine the fundamental purpose of the U.S. patent system. After all, from the end of the Cold War to today, the United States undisputedly is the predominant global economic and inventive power. It seems silly to question whether the U.S. patent system is doing enough for the public when the United States is leading the world in technology and innovation.

1. *Graham v. John Deere Co.*, 383 U.S. 1, 9 (1966).

But the competitors of the United States have been catching up. The 2017 edition of “Global Trends,” a text prepared by the National Intelligence Council for the President every four years, provides this assessment of the United States in the changing global dynamics:

Economic, technological, and security trends are increasing the number of states that can exert geopolitical influence, bringing the unipolar post-Cold War period to a close. The economic progress of the past century has widened the number of states—Brazil, China, India, Indonesia, Iran, Mexico, and Turkey—with material claims to great and middle power status. . . . Even with profound uncertainties regarding the future of global economic growth, leading forecasters broadly agree that emerging market economies like China and India will contribute a much larger share of global GDP than is currently the case—shifting the focus of the world’s economic activity eastward.²

The U.S. intelligence apparatus itself admits that the *Pax Americana* is at an end. Even now, the rivals of the United States are beginning to surpass the United States in terms of inventions and scientific research.³ The future promises only more challenges and competition for U.S. science and engineering.

The reality is that the U.S. patent system, if left unchanged, will exact patent monopolies on Americans over an increasing number of inventions of which Americans play no part in their invention and play no part in their manufacture. And it is time to consider whether such a patent system is doing enough public good and, if it is not, what needs to be changed so that it can better serve the people of the United States.

This Article makes the case that, in view of the global dynamics, a new, robust working requirement should be introduced into U.S. patent law. The Article begins with an examination of the fundamental

2. NAT’L INTELLIGENCE COUNCIL, GLOBAL TRENDS: PARADOX OF PROGRESS 26 (2017) (emphasis removed from original).

3. See, e.g., Press Release, *Global Patent Applications Rose to 2.9 Million in 2015 on Strong Growth from China; Demand Also Increased for Other Intellectual Property Rights*, WORLD INTELL. PROP. ORG. (Nov. 23, 2016), http://www.wipo.int/pressroom/en/articles/2016/article_0017.html (“Chinese innovators filed the most patent applications (1,010,406) in 2015, followed by those from the United States of America (526,296) and Japan (454,285)”); Richard Van Noorden, *China by the Numbers*, 534 NATURE 452, 452–53 (2016), <http://www.nature.com/news/china-by-the-numbers-1.20122>.

purposes that patent law should serve. After exploring the dominant justifications for the U.S. patent system and their deficiencies in light of these changing times, it proposes a return to the nationalistic conception of patent law as a means to develop the national economy and state of science and technology, as the Framers of the Constitution envisioned when they explicitly armed Congress with the power to promulgate a patent law.

This Article subsequently explains what a working requirement is through an exploration of the variants of the working requirement in foreign patent laws. It then sets forth how the particular species of working requirement that encourages the domestic manufacture of patented goods can help the U.S. patent system fulfill its original, intended function and how the working requirement may fit with the existing patent law and serve the industrial policy of the United States.

The final section of this Article fleshes out the working requirement with policy details. It analyzes how the working requirement should be structured to prevent abuse and presents a law and economics analysis as to when and how the working requirement can be applied.

The discussion of such a working requirement is particularly timely given the Trump Administration's "buy American and hire American" policy. While there has been much mention in the media about tariffs and trade deal renegotiation, little attention has been paid to how patent law should be adjusted to fit within these larger policy objectives. This omission is curious given the close relationship between patent law and trade law; as the United States now embarks on a protectionist course, there ought to be a serious conversation about how patent law should work with trade law to increase manufacturing within the United States.⁴ Indeed, as this

4. The lack of any discussion on how to change patent law to increase manufacturing can be seen in the following statement President Trump was reported to have made in a meeting with his advisors:

[Chief of Staff] John [Kelly], you haven't been in a trade discussion before, so I want to share with you my views. For the last six months, this same group of geniuses comes in here all the time and I tell them, "Tariffs. I want tariffs." And what do they do? They bring me IP. I can't put a tariff on IP.

Jonathan Swan, *Exclusive: Trump Vents in Oval Office, "I Want Tariffs. Bring Me Some Tariffs!"*, AXIOS (Aug. 27, 2017), <https://www.axios.com/exclusive-trump-vents-in-oval-office-i-want-tariffs-bring-me-some-tariffs-1513305111-5cba21a2-6438-429a-9377-30f6c4cf2e9e.html> (pro-

Article explains, there are reasons to think that a new patent working requirement is a more efficient and less drastic tool than tariffs in effectuating this overall policy goal. At the very least, the United States should consider a new patent working requirement before waging a trade war against its economic competitors.

II. THE FUNCTION OF PATENT LAW

To understand why a working requirement should be introduced into patent law, it is important to understand the purpose of the U.S. patent system. I begin by examining the deficiencies of the justifications of patent systems currently advanced by U.S. scholars and then propose a return to the old, nationalistic conception of patent law.

A. Current U.S. Justifications for the Patent System and Their Deficiencies

In modern U.S. legal literature, there are four dominant theoretical justifications for the patent system: (A) incentive to invent, (B) disclosure, (C) commercialization, and (D) race to invent. The first of these has a long history, as reflected in these words in a correspondence from Thomas Jefferson to James Madison: “[T]he

viding a partial transcription of the meeting which was not disputed by the White House). While it is indeed impossible to “put a tariff on IP,” when “tariff” is strictly understood in its legal sense, a patent working requirement is in effect “a tariff on IP.” The President’s statement that he “can’t put a tariff on IP” indicates that the “group of geniuses” and his other advisors have not informed him about the existence of such a policy option.

It is also notable that, in the wake of the meeting, the President instructed the Trade Representative to launch an investigation of Chinese intellectual property theft, with the ultimate aim of imposing tariffs should a violation be found. *Id.*; *USTR Announces Initiation of Section 301 Investigation of China*, OFF. U.S. TRADE REPRESENTATIVE (Aug. 18, 2017), <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2017/august/ustr-announces-initiation-section>; Jeff Mason, *Exclusive: Trump Considers Big ‘Fine’ over China Intellectual Property Theft*, REUTERS (Jan. 17, 2018, 1:28 PM), <https://www.reuters.com/article/us-usa-trump-trade-exclusive/exclusive-trump-considers-big-fine-over-china-intellectual-property-theft-idUSKBN1F62SR>. Compared to using intellectual property as a way to generate tariffs, there have been very few discussions or policy proposals about changing intellectual property law itself as a direct measure to improve manufacturing.

incitements to ingenuity, which is spurred on by the hope of a monopoly for a limited time”⁵

In other words, a patent system motivates inventors to actually do inventive work through the heightened profits of a monopoly.

In contrast, the disclosure justification treats the patent monopolies as bribes to inventors to disclose publicly what they otherwise would have kept as trade secrets. As the Supreme Court explained:

When a patent is granted and the information contained in it is circulated to the general public and those especially skilled in the trade, such additions to the general store of knowledge are of such importance to the public weal that the Federal Government is willing to pay the high price of 17 years of exclusive use for its disclosure, which disclosure, it is assumed, will stimulate ideas and the eventual development of further significant advances in the art.⁶

The commercialization theory, according to Henry Smith, views “the role of the patent as a prospect, allowing the patent holder (who need not be the inventor) to take actions to raise the value of the patent prospect—for example, through further research or through marketing efforts.”⁷ As reflected in the title of Smith’s article, *Intellectual Property as Property*, the concept is built off of an idealization of rights to patents as something almost as strong as rights to physical property.

Mark Lemley, through an examination of the histories of the most important inventions such as the steam engine, telephone, and airplane, has developed the concept of a race to invent as a justification for the patent system:

It is possible that patents encourage putative inventors to race to achieve a result first, and in doing so get us a greater variety of inventions more quickly than we would have in the absence of patent protection.

5. Letter from Thomas Jefferson to James Madison (July 31, 1788), in THE THOMAS JEFFERSON PAPERS AT THE LIBRARY OF CONGRESS: SERIES 1: GENERAL CORRESPONDENCE, 1651–1827, at 7070, <http://hdl.loc.gov/loc.mss/mtj.mtjbib003711>.

6. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 481 (1974).

7. Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1815 (2007).

....

... [I]nventors aren't driven by the lure of being a monopolist so much as by the risk of losing a race and being excluded from competition in that market.⁸

The four theories all take the form of a grand theoretical justification of a patent system that is abstract, idealized, and universal. After all, none of these theories seek to account for the existence of competing national governments and their respective interests; they couch the benefits of patents in terms of some universal greater good.⁹

The reality, however, is that there is no generalized patent system. It not only does not exist but cannot exist so long as there are sovereign nations with divergent interests. After all, patents are state-granted monopolies. Patents are not a necessary feature of sovereignty, but they cannot function in the absence of a sovereign power that backs the monopoly. Furthermore, the fundamental matter regulated by patents is technological development, which, in turn, is intrinsically tied to the ability of a nation to win in war and to compete in trade. Nations naturally inject their needs, ambitions, and interests into their patent laws.¹⁰ Thus, it seems absurd to discuss why patent systems exist by abstracting away the existence of nations.

Accordingly, any theory that fails to explain patent systems with reference to a particular patent system and with reference to the strategic realities of the nation creating the system is inherently lacking, however elegant it may be. Each patent system should be justified with reference to the particular national government and with consideration of the circumstances and context of the national market the system is supposed to serve. Given that the four theories of incentive to invent, disclosure, commercialization, and race to

8. Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 755 (2012).

9. From a broader perspective, the four justifications presented here and even the justification advanced within this Article of advancing the national state of scientific development fall under the umbrella of utilitarian justifications of intellectual property. A summary of other less prevalent theories is provided in Adam Moore & Ken Himma, *Intellectual Property*, STAN. ENCYCLOPEDIA PHIL. ARCHIVE (Mar. 8, 2011), <https://plato.stanford.edu/archives/win2014/entries/intellectual-property/>.

10. As seen in the subsequent discussion, the working requirements adopted by the various nations reflect their own industrial objectives.

invent take no account of such contextual details as economics or state of development, they cannot justify *all* patent systems.

Nonetheless, do these four theories at the least explain the need for a U.S. patent system? The answer is no.

Let us first consider the three theories of incentive to invent, commercialization, and race to invent, all of which identify innovation as the fundamental societal benefit. If they are to account for the existence of the U.S. patent system, then it must be the case that inventors desire, or actually require, the rewards of U.S. patent monopolies as motivation to invent or to commercialize inventions.

All three are plausible justifications for the U.S. patent system so long as the United States remains the dominant economic and inventive power. But a conceptual difficulty arises when another market has surpassed the U.S. market to be the biggest and most attractive market. Why should the United States award monopoly rights to inventors who find their motivation to invent, commercialize, or race through other foreign markets?

It may be easier to consider the deficiencies of these three patent law justifications from another angle. In 2004, two years before the Islamic Courts Union imposed some form of a unified government over the nation, Somalia had nothing resembling national laws, much less a patent system. Yet residents of Mogadishu had access to high speed internet, and even remote areas of Somalia were online. Mobile phones were widely available, and Somalis enjoyed Hotmail service. There was even discussion of the installation of a 3G network.¹¹ Clearly, the lack of a Somali patent system inhibited neither the invention, the race to invent, nor the commercialization of all these telecommunications technologies.¹²

Justifications for any Somali patent system therefore must lie elsewhere—because, in the globalized world, the sufficiency of incentive to invent, commercialization, and race to invent as justifications for a given patent system is dependent on the strength of

11. Joseph Winter, *Telecoms Thriving in Lawless Somalia*, BBC NEWS (Nov. 19, 2004, 6:30 AM), <http://news.bbc.co.uk/2/hi/africa/4020259.stm>.

12. It may be argued that a Somali patent system would have helped promote the invention of the telecommunications technologies in Somalia. But Somalis with access to the patent system of the Western nations and by extension to the profits of patent monopolies in the Western nations already have the motivation to do inventive work, whether they are incentivized to invent or whether they wish to race. Somalia clearly had not been an inventive power in recent times, but it was not for lack of a patent system.

the local market in relation to the world market. If the United States were to be supplanted by one or more of its competitors as the dominant global market, these three theories would lose their viability as justification for the U.S. patent system just as they could not now serve as justification for a Somali patent system.

As the Supreme Court has noted in these oft-cited lines, “[A] patent is an exception to the general rule against monopolies and to the right to access to a free and open market,” whose “far-reaching social and economic consequences . . . give the public a paramount interest in seeing that patent monopolies . . . are kept within their legitimate scope.”¹³ It is in the public interest to provide to inventors no more than is needed to motivate them to invent, commercialize, or race. If the competitors of the United States have provided all the necessary incentives, then there is no need for a U.S. patent system that subjects Americans to unnecessary patent monopolies.

This danger that the United States will lose its position as the dominant market is very real; in fact, it could be argued that the United States is already no longer the dominant market for innovative products. It is worthwhile to summarize some aspects of the key trends:

- *Automobiles*. In 2009, the number of cars sold in China exceeded that in the United States.¹⁴ In 2010, General Motors sold more cars in a foreign market, China, than in its home market.¹⁵ In 2016, General Motors delivered nearly 3.9 million vehicles in China, 30% more than the 3.0 million vehicles delivered in the United States.¹⁶

13. Precision Instrument Mfg. Co. v. Auto. Maint. Mach. Co., 324 U.S. 806, 816 (1945).

14. Chris Hogg, *China's Car Industry Overtakes US*, BBC NEWS (Feb. 10, 2009, 7:52 AM), <http://news.bbc.co.uk/2/hi/business/7879372.stm>.

15. Jerry Hirsch, *GM's China Sales Top U.S. Total, A First for the Automaker*, L.A. TIMES (Jan. 25, 2011), <http://articles.latimes.com/2011/jan/25/business/la-fi-autos-gm-20110125>.

16. GENERAL MOTORS, GM U.S. DELIVERIES FOR DECEMBER 2016 (2016), <https://www.gm.com/content/dam/gm/mol/docs/Deliveries-December-2016.pdf>; *General Motors Posts 2016 Delivery Record in China*, GEN. MOTORS CORP. NEWSROOM (Jan. 5, 2017), http://media.gm.com/media/cn/en/gm/news.detail.html/content/Pages/news/cn/en/2017/Jan/01_05_sales.html.

- *Semiconductors*. As of 2011, China overtook the United States as the dominant smartphone market.¹⁷ At the end of 2015, there were estimated to be more than 131 million iPhones in use in China, about 20% more than the 110 million units in use within the United States.¹⁸

- *Internet and Internet Services*. In 2009, China's population of internet users reached 384 million, exceeding the entire population of the United States and establishing China as the largest online community.¹⁹ At the end of 2015, the number of internet users in China was more than double the entire population of the United States.²⁰ As of October 2016, Uber and Lyft served roughly 80 million rides in the United States per month.²¹ In contrast, Didi, the market leader in ride-sharing in China, clocks 20 million rides *per day*.²²

- *Aviation*. In terms of passenger numbers, China is expected to surpass the United States as the largest aviation market in 2024.²³ Boeing projects that, over the next two decades, the demand for airplanes within the Asia Pacific region will be worth \$2.5 trillion, compared to \$1.04 trillion for the North America market.²⁴

- *Clean Energy*. Since 2009, China has firmly and decisively seized the lead in clean energy investments, and its \$54.4 billion worth of investments in 2010 is 60% larger than that of the United

17. Rhiannon Williams, *World's Biggest Smartphone Market Hits Saturation as Sales in China Fall for First Time*, TELEGRAPH (Aug. 20, 2015, 8:00 AM), <http://www.telegraph.co.uk/technology/mobile-phones/11812322/smartphone-sales-in-china-fall-says-gartner.html>.

18. Don Reisinger, *Just How Popular is the iPhone in China?*, FORTUNE (May 18, 2016), <http://fortune.com/2016/05/18/apple-iphone-china/>.

19. *China Internet Population Hits 384 Million*, REUTERS (Jan. 15, 2010, 2:12 AM), <http://www.reuters.com/article/2010/01/15/china-internet-idUSTOE60E06S20100115>.

20. Melanie Lee, *China's Nearly 700 Million Internet Users are Hot for Online Finance*, FORBES (Jan. 25, 2016, 9:05 AM), <http://www.forbes.com/sites/melanieleest/2016/01/25/chinas-nearly-700-million-internet-users-are-hot-for-online-finance/>.

21. Kia Kokalitcheva, *Lyft Will Complete 17 Million U.S. Rides This Month*, FORTUNE (Oct. 25, 2016), <http://fortune.com/2016/10/25/lyft-17-million-rides/>.

22. *Id.*

23. Chris Cooper, *China to Surpass U.S. as World's Largest Aviation Market by 2024*, BLOOMBERG MKTS. (Oct. 20, 2016, 10:18 PM), <https://www.bloomberg.com/news/articles/2016-10-21/china-to-surpass-u-s-as-world-s-largest-aviation-market-by-2024>.

24. BOEING, CURRENT MARKET OUTLOOK 2017-2036, <http://www.boeing.com/resources/boeingdotcom/commercial/market/current-market-outlook-2017/assets/download/2017-cmo-6-19.pdf>.

States.²⁵ As of this writing, China has the most wind energy, solar energy, and hydropower capacity in the world.²⁶

- *Pharmaceuticals*. In 2009, China was the fifth largest pharmaceutical market.²⁷ Today, China is the second.²⁸ The U.S. Department of Commerce projects that by 2020, the Chinese market will reach \$315 billion, close to the forecasted \$475 billion for the U.S. market.²⁹

Across areas of industry and innovation, which is the central concern of patent law, foreign markets—particularly China’s—are surpassing that of the United States in size and importance. For many technology industry players, the Chinese market is already as significant as, if not more so than, the U.S. market.³⁰ In light of similar, though more modest, trends from other emerging countries, it is doubtful on a long-term, 30- to 100-year horizon whether the U.S. market will even be needed to motivate inventors, who might come to value their foreign patents more than their U.S. patents because they profit more from marketing their inventions in these foreign markets.³¹ It is telling that, as of this writing, there are more patent applications filed at China’s patent office than those of the United States, Japan, and South Korea, *combined*.³²

25. THE PEW CHARITABLE TRS., WHO’S WINNING THE CLEAN ENERGY RACE? 2010 EDITION 11 (2011), <http://www.pewtrusts.org/~media/legacy/uploadedfiles/peg/publications/report/g20reportlowresfinal.pdf>.

26. Wade Shepard, *If China Is So Committed to Renewable Energy, Why Are So Many New Coal Plants Being Built?*, FORBES (July 8, 2016, 10:11 AM), <http://www.forbes.com/sites/wadeshepard/2016/07/08/if-china-is-so-committed-to-renewable-energy-why-are-so-many-new-coal-plants-being-built/#311c97db65f7>.

27. DAVID CAMPBELL & MANDY CHUI, IMS HEALTH, PHARMERGING SHAKE-UP: NEW IMPERATIVES IN A REDEFINED WORLD 5 (2011), <http://ficci.in/spdocument/20174/PHARMERGING%20SHAKE-UP.pdf>.

28. *China’s Drug-Price Cuts Are Hitting Big Pharma Where It Hurts*, BLOOMBERG NEWS (Mar. 8, 2016, 9:00 AM), <https://www.bloomberg.com/news/articles/2016-03-08/big-pharma-s-china-dream-meets-reality-of-price-cutting-campaign>.

29. *China-Pharmaceuticals*, EXPORT.GOV (May 31, 2016), <https://web.archive.org/web/20170418211316/https://www.export.gov/article?id=China-Pharmaceuticals>.

30. *See, e.g.*, BOEING, *supra* note 24 (indicating valuations conducted by Boeing of the Chinese aviation market over the next 20 years at \$1.085 trillion exceed that of the entire North American market at \$1.040 trillion).

31. It is possible that a U.S. patent may remain more valuable than a Chinese patent, even if the Chinese market become more important to inventors than the U.S. market, if U.S. patent damages remain sufficiently high. However, it would seem somewhat perverse if inventors value patents more for the patent damages they can obtain than the sales they can derive from their patent monopolies, and such a consideration should be discarded in a justification for the patent system.

32. Press Release, *supra* note 3.

Therefore, any attempt to justify the U.S. patent system, as the situation now stands, should take into account the near inevitability that the U.S. market will be reduced to only one of many markets that civilian inventors are primarily interested in. The ability of the theories of incentive to invent, commercialization, and race to invent to justify the U.S. patent system will correspondingly erode along with the economic dominance of the United States.

The theory of disclosure stands in a slightly different position because it identifies disclosure of inventions, not innovation itself, as the public good to be achieved by patent systems. Accordingly, its ability to account for the U.S. patent system does not lose viability simply because the U.S. market has been overtaken by others. There is a legitimate argument that the U.S. public should be subject to patent monopolies because it is in the interest of the United States that disclosures of inventions that might have been created and designed for other markets nonetheless be submitted to the United States Patent and Trademark Office (USPTO) for public examination and research.

However, disclosure as a rationale is strongly undermined by other currents of the modern global economy, where accessibility to information has been made so easy. Even in 1986, the Federal Circuit considered a German doctoral thesis to be “sufficiently accessible, at least to the public interested in the art,” simply because it “most probably was available for general use” in light of the practices of the university library where the thesis was maintained.³³ In the modern digital age, the internet serves as a virtual Library of Alexandria, where content, once released, is accessible everywhere. The days of excavating library stacks for a heavy, book-bound thesis are little more than fond memories. Consequently, it is unclear why the United States could not rely on disclosures to foreign patent offices or to online academic channels to gain access to technical disclosures of inventions.

A disclosure theorist might also argue that there is value in the USPTO being an additional, independent source of preservation for documentations of inventions. After all, catastrophic destruction of patent data is not unknown; thousands of U.S. patents were forever

33. *In re Hall*, 781 F.2d 897, 898-99 (Fed. Cir. 1986).

lost through The Great Patent Fire of 1836.³⁴ But with the inexorable development of redundant data repositories and distribution of downloaded digital documents, it is difficult to conceive of any scenario in the modern day, barring a thermonuclear war, that patents could be destroyed. And even if foreign patent offices were untrustworthy custodians of technological disclosures, the modern response to the problem ought to be special funding to the Library of Congress to download, translate, and preserve foreign patents, not the imposition of patent monopolies on the back of the U.S. public.

Finally, it may be argued that the United States should nonetheless use its own patent system to lure inventors to disclose, because the United States would then be able to impose its own quality standards of disclosure. However, even if we assume that the U.S. disclosure standards are the most stringent, it is difficult to imagine that the disclosure standards of the second most stringent jurisdiction among the important markets of the world is so inferior that the difference is worth imposing patent monopolies on Americans.

Given the inability of the prevailing theories to explain the need for the U.S. patent system in a multipolar world where the U.S. market is becoming less dominant, it is necessary for us to reexamine what the U.S. patent system should be used for.

*B. Development of the National State of Science and Technology
as Justification for the Patent System*

At this juncture, it would be proper to consider why the Constitution authorizes Congress to create a patent law in the first place: "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."³⁵ The words, "[t]o promote the Progress of Science and useful Arts," are especially significant because, of the eighteen clauses enumerating the powers granted to Congress, the Patent and Copyright Clause

34. *December 15th Marks the 165th Anniversary of The Great Patent Office Fire of 1836*, U.S. PAT. & TRADEMARK OFF. (Dec. 14, 2001), <https://www.uspto.gov/about-us/news-updates/december-15th-marks-165th-anniversary-great-patent-office-fire-1836>.

35. U.S. CONST. art. I, § 8, cl. 8.

is one of only two that explicitly spell forth the purpose of the power.³⁶ And, as the Supreme Court explained, “This . . . *standard* expressed in the Constitution . . . may not be ignored.”³⁷

It must be noted that the Framers left few clues about what it means “[t]o promote the Progress of Science and useful Arts.”³⁸ At the time of the drafting of the Constitution, there was little dispute that patents can serve a public good.³⁹ The insertion of the Patent and Copyright Clause into the Constitution was not controversial—in the words of the Federalist, “The utility of this power will scarcely be questioned.”⁴⁰

To that end, it may be argued that the Framers, in using the capitalized words “Science” and “useful Arts” in the Patent and Copyright Clause, were referring to the Science and useful Arts of humanity as a whole. Certainly, the concept of referring to the Arts and the Sciences in the abstract has been long established.⁴¹ It would be tempting to think that the Framers, swept up in the frenzy of the Enlightenment, would seek to promote the Progress of Science and useful Arts of all humanity by the creation of a U.S. patent and copyright system.

However, a better interpretation of “[t]o promote the Progress of Science and useful Arts” would be a nationalistic one, that is, “to promote the Progress of *American* Science and useful Arts.” To begin with, the patent systems created in Europe were nationalistic in

36. *Id.*

37. *Graham v. John Deere Co.*, 383 U.S. 1, 6 (1966).

38. We do know that “[t]o promote the Progress of Science and useful Arts” excludes the grant of a monopoly as a political favor or as a revenue generating measure. Colin D. Moore, *The Power to Regulate Patents and Copyright*, in *THE POWERS OF THE U.S. CONGRESS: WHERE CONSTITUTIONAL AUTHORITY BEGINS AND ENDS* 95, 95–96 (Brien Hallett ed., 2016); see also *Graham*, 383 U.S. at 5 (“This qualified authority, unlike the power often exercised in the sixteenth and seventeenth centuries by the English Crown, is limited to the promotion of advances in the ‘useful arts.’ It was written against the backdrop of the practices—eventually curtailed by the Statute of Monopolies—of the Crown in granting monopolies to court favorites in goods or businesses which had long before been enjoyed by the public.”).

39. Moore, *supra* note 38, at 98.

40. THE FEDERALIST NO. 43 (James Madison).

41. For example, the Arts and the Sciences have even before the American Revolution been long allegorized in countless pieces of artwork. An example would be “Minerva as Protectress of the Arts and Sciences,” by Luca Giordano, a work created in the 1680s that is now exhibited in The National Gallery in London. A picture of the work is viewable on the website of the National Gallery at <https://www.nationalgallery.org.uk/paintings/luca-giordano-minerva-as-protectress-of-the-arts-and-sciences>.

conception and purpose.⁴² The Statute on Industrial Brevets of 1474 of the Venetian Republic, generally credited as the first codification of patent practices, made its objectives very clear:

There are men in this city, and also there come other persons every day from different places by reason of its greatness and goodness, who have most clever minds, capable of devising and inventing all kinds of ingenious contrivances. And should it be legislated that the works and contrivances invented by them could not be copied and made by others so that they are deprived of their honour, men of such kind would exert their minds, invent and make things that would be of no small utility and benefit to our State. Therefore, . . . any person in this city who makes any new and ingenious contrivances not made heretofore in our Dominion, shall, as soon as it is perfected so that it can be used and exercised, give notice of the same to the office of our Provveditori di Comun, having been forbidden up to ten years to any other person in any territory and place of ours to make a contrivance in the form and resemblance of that one without the consent and license of the author. . . . But our Government will be free, at its complete discretion, to take and use for its needs any of the said contrivances and instruments, with this condition, however, that no one other than the authors shall operate them.⁴³

The law's explicit aim was to incentivize skilled workers to either stay within or move to Venice, bringing with them their businesses and know-how, which, in the words of the law, were of "no small utility and benefit to our State."⁴⁴ The law aimed to accomplish this objective by extending patents to "new and ingenious contrivances not made heretofore in our Dominion," incentivizing people who made "new and ingenious contrivances" outside to bring their manufacturing into Venice. The nationalistic

42. Joanna Kostylo, *Commentary on: Venetian Statute on Industrial Brevets (1474)*, in PRIMARY SOURCES ON COPYRIGHT (1450-1900) (Lionel Bently & Martin Kretschmer eds., 2008), http://www.copyrighthistory.org/cam/tools/request/showRecord?id=commentary_i_1474.

43. Statute on Industrial Brevet of 1474 (Venetian Republic), in PRIMARY SOURCES ON COPYRIGHT, *supra* note 42, http://www.copyrighthistory.org/cam/tools/request/showRecord.php?id=record_i_1474.

44. *Id.*

aim was also reflected in the provision that Venice reserves the discretion to practice the patent for its own needs.⁴⁵

There is simply no reason to think that the Framers of the Constitution were unaware of these nationalistic objectives underlying the patent systems then in existence. Their silence indicates that they sought to achieve the same goals when they crafted the Patent and Copyright Clause; had they wanted the U.S. patent system to achieve a different result, they likely would have left some instructions to that effect. Indeed, President Washington, in his first annual address to Congress, urged Congress to create a patent system with the following words:

I cannot forbear intimating to you the expediency of giving effectual encouragement as well to the *introduction of new and useful inventions from abroad*, as to the *exertions of skill and genius in producing them at home*⁴⁶

The stated aims can hardly be differentiated from those of the Venetian patent system to have persons of “most clever minds” in Venice and elsewhere come to Venice to “make things that would be of no small utility and benefit to our State.”

The words, “[t]o promote the Progress of Science and Useful Arts,” must also be understood in light of the very dim view the Framers had of monopolies. In a 1788 letter, James Madison wrote the following passage to persuade a skeptical Thomas Jefferson about the benefits of a copyright and patent power:

With regard to monopolies they are justly classified among the greatest nuisances [sic] in Government. But is it clear that as encouragements to literary works and ingenious discoveries, they are not too valuable to be wholly renounced? Would it not suffice to reserve in all cases a right to the Public to abolish the privilege at a price to be specified in the grant of it? Is there not also infinitely less danger of this abuse in our Governments, than in

45. For a description of the English counterpart to the Venetian system, see Paul Champ & Amir Attaran, *Patent Rights and Local Working Under the WTO TRIPS Agreement: An Analysis of the U.S.-Brazil Patent Dispute*, 27 YALE J. INT'L L. 365, 370-71 (2002).

46. Letter from George Washington to the U.S. Senate and House of Representatives (Jan. 8, 1790), in 4 THE PAPERS OF GEORGE WASHINGTON 543, 547 (Dorothy Twohig ed., 1993) (emphasis added), available at <https://founders.archives.gov/documents/Washington/05-04-02-0361>.

most others? Monopolies are sacrifices of the many to the few. Where the power is in the few it is natural for them to sacrifice the many to their own partialities and corruptions. Where the power, as with us, is in the many not in the few, the danger can not be very great that the few will be thus favored. It is much more to be dreaded that the few will be unnecessarily sacrificed to the many.⁴⁷

The Framers of the Constitution clearly thought that the public granting the monopoly suffers the “sacrifice” so that that very same public can derive some direct benefit.

Within the context of the state of the world economy and technology at the drafting of the Constitution, this conception of patent law is fundamentally nationalistic. At the time, Britain was on the verge of the Industrial Revolution.⁴⁸ As Joel Mokyr notes, “in the eighteenth century the British market was large enough to cover the costs of invention,”⁴⁹ to ensure that there was a minimum market demand to support the creation of inventions.

If the Framers regarded monopolies “among the greatest nuisances in Government,”⁵⁰ then they had no reason to arm the U.S. government with the power to authorize monopolies in order to promote the Science and useful Arts of all humanity. After all, the British and Continental markets already provided sufficient reward for this purpose. An imposition of monopolies on the public of the United States might add little more than a small boost. That the Framers nonetheless added the Patent and Copyright Clause to the Constitution implies that the U.S. public stood to gain in some unique and distinct way from a U.S. patent system.

Finally, it is worthwhile to consider the requirements of the early U.S. intellectual property laws. The Patent Act of 1793 limited U.S. patent grants to “a citizen or citizens of the United States.”⁵¹ It

47. Letter from James Madison to Thomas Jefferson (Oct. 17, 1788), in 11 THE PAPERS OF JAMES MADISON 295, 295-300 (Robert A. Rutland & Charles F. Hobson eds., 1977), available at <https://founders.archives.gov/documents/Madison/01-11-02-0218>.

48. By convention, the Industrial Revolution began in the late 18th century. See, e.g., *The Third Industrial Revolution*, ECONOMIST (Apr. 21, 2012), <http://www.economist.com/node/21553017>. The Constitution was written in 1787.

49. JOEL MOKYR, THE LEVER OF RICHES: TECHNOLOGICAL CREATIVITY AND ECONOMIC PROGRESS 245 (2014).

50. Letter from James Madison to Thomas Jefferson, *supra* note 47.

51. Patent Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318.

was only in 1800 that the right to apply for patents was extended to “aliens who at the time of petitioning . . . have resided for two years within the United States.”⁵² The cousin of the Patent Acts, the Copyright Act of 1790, limited copyright protection to materials “printed within these United States” and could be asserted only by “a citizen or citizens thereof, or resident within the same.”⁵³ The early U.S. patents and copyrights were granted in a time when the modern concept of outsourcing and publication did not exist. Patents and copyrights were, in effect, available only to inventors and writers based in the United States and limited to inventions manufactured and writing printed within the United States.⁵⁴

In view of all this, it is hard to argue that the Patent and Copyright Clause was meant for anything other than nationalistic ends. And, as the United States now seeks to defend what remains of its economic vitality and strength, it is worth reconsidering these original roots of the patent system as a measure of technological nationalism.

It must be emphasized that this nationalistic conception of U.S. patent law is by no means antiquated. Nationalism still defines some of the United States’ competitors’ views of their own patent law systems. The Outline of the National Intellectual Property Strategy promulgated by the State Council of China in 2008 envisions Chinese intellectual property law as a strategic lever for development:

Intellectual property system is a basic system for developing and utilizing knowledge-based resources. By reasonably determining people’s rights to certain knowledge and other information, the intellectual property system adjusts the interests among different groups of persons in the process of creating and utilizing knowledge and information, encourages innovation and promotes economic and social progress. In the world today, with the development of the knowledge-based economy and economic globalization, intellectual property is becoming increasingly a strategic resource in national development and a core element in international competitiveness, an important supporting force in building an innovative country and the key to hold the initiative

52. Patent Act of Apr. 17, 1800, ch. 25, § 1, 2 Stat. 37.

53. Copyright Act of 1790, ch. 15, § 1, 1 Stat. 124.

54. *Id.*

in development. The international community attaches greater importance to intellectual property as well as innovation. Developed countries take innovation as the main impetus driving economic development, and make full use of the intellectual property system to maintain their competitive advantages. Developing countries actively adopt intellectual property policies and measures suitable for their respective national conditions to promote development.⁵⁵

The same subordination of patent law to national strategic needs can be observed in the account of the negotiations concerning the free distribution of patented AIDS drugs in Brazil by President Fernando Henrique Cardoso, who frankly admits how patent rights stand in relation to political considerations:

With regard to the issue of patents, I simply believed that the unique magnitude of the AIDS crisis justified our actions. Human lives took precedence over profits. It was clear that the free-market system would not be able to provide a solution by itself, so the government was needed as a mediator. We tried to reach a compromise, offering to pay the foreign pharmaceutical companies what we could. It was less than they wanted, but it was better than nothing – which is what they would have received if there had been no program at all.⁵⁶

For the competitors of the United States, any ideal about some universally fair patent property rights means very little in the face of raw politics and strategic practicalities. The Framers of the Constitution also saw the objectives of U.S. patent law as nationalistic.⁵⁷ Why should we, today, not also look to the patent system

55. Guojia Zhishichanquan Zhanlue Gangyao (国家知识产权战略纲要) [Outline of the National Intellectual Property Strategy] (promulgated by the St. Council, June 5, 2008), ST. COUNCIL GAZ., June 21, 2008, art. 2, http://www.gov.cn/english/2008-06/21/content_1023471.htm (China).

56. FERNANDO HENRIQUE CARDOSO, THE ACCIDENTAL PRESIDENT OF BRAZIL 216 (2006).

57. Interestingly enough, the National Security Strategy of the United States of America promulgated by the Trump Administration treats intellectual property as a strategic asset that needs to be safeguarded. See NATIONAL SECURITY STRATEGY OF THE UNITED STATES OF AMERICA 21–22 (2017) (stating that the United States will protect the “national security innovation base” by prioritizing the prevention of intellectual property theft through counterintelligence and police activities). However, the document does not set forth a role for intellectual property laws for enhancing the strategic objectives of the United States

to serve the good of the nation? If anything, modern U.S. legal literature is unique in its grand, universal conceptions of patent systems, without considering the state of the international balance of technological and trade power. One must wonder if we have dived too far into theoretical ideals and have forgotten about the realities of our world.⁵⁸

III. A ROBUST WORKING REQUIREMENT

In the previous section, I argued that the Constitutional command, “[t]o promote the Progress of Science and useful Arts,” is “to promote the Progress of *American* Science and useful Arts.” I will now explain how the reinstatement of a working requirement would help the patent system fulfill this constitutional command. I begin with an exploration of the various forms of working requirements and proceed to discuss how a robust working requirement would encourage the technological manufacturing in the United States that is important to promoting American Science and useful Arts. I then contextualize the new working requirement within the development of U.S. patent law and industrial objectives.

A. Variants of the Working Requirement

Prior to a discussion about a new working requirement in U.S. patent law, it is important to set forth what is meant by a “working requirement.” In the simplest form, a working requirement motivates patentees to “work” their patents by imposing some form of punishment on non-workers. However, there are two important variables: (1) the nature of the punishment and (2) the definition of a non-worker.

Traditionally, non-workers of patents are punished with forfeiture of patents.⁵⁹ However, by the late nineteenth century, such a

except to state that new trade agreements “must adhere to high standards in intellectual property. *Id.* at 20.

58. Herbert Hovenkamp has written a history on how U.S. scholars and jurisprudence came to move away from a conception of patent law as a tool for domestic economic development. Herbert Hovenkamp, *The Emergence of Classical American Patent Law*, 58 ARIZ. L. REV. 263 (2016). In his words, “The result was a patent system increasingly detached from questions about economic development.” *Id.* at 306.

59. The traditional punishment can be found in the Patent Act of 1832, which imposed a working requirement on foreign patent holders. According to the Supreme Court:

“use it or lose it” system was considered too harsh. The nations have therefore converged on the international standard of compulsory licenses, as seen in Article 5A of the Paris Convention for the Protection of Industrial Property (Paris Convention):

(1) Importation by the patentee into the country where the patent has been granted⁶⁰ of articles manufactured in any of the countries of the Union shall not entail forfeiture of the patent.

(2) Each country of the Union shall have the right to take legislative measures providing for the grant of compulsory licenses to prevent the abuses which might result from the exercise of the exclusive rights conferred by the patent, for example, failure to work.⁶¹

Compulsory licenses, which translate to diminished profits, as a punishment for failure to work is a choice wisely agreed upon. The proposal within this Article accepts compulsory licenses as a proper punishment for the non-worker and will not analyze the possibility of harsher punishments.⁶²

Greater controversy surrounds the definition of a “non-worker.” This Article will now explore this topic with a survey of the various definitions of a non-worker in the patent laws of different nations.

[The Patent Act of 1832] extended the privilege of the patent law to aliens, but required them “to introduce into public use in the United States the invention or improvement within one year from the issuing thereof,” and indulged no intermission of the public use for any period longer than six months. A violation of the law rendered the patent void.

Cont’l Paper Bag Co. v. E. Paper Bag Co., 210 U.S. 405, 429 (1908). This traditional working requirement is similar to the working requirement within trademark law, which requires continual use for rights to adhere. *See, e.g.,* United Drug Co. v. Theodore Rectanus Co., 248 U.S. 90, 97 (1918) (“The law of trade-marks is but a part of the broader law of unfair competition; the right to a particular mark grows out of its use, not its mere adoption; its function is simply to designate the goods as the product of a particular trader and to protect his good will against the sale of another’s product as his; and it is not the subject of property except in connection with an existing business.”).

60. The words “[i]mportation by the patentee into the country where the patent has been granted of articles” is a reference to a definition of the non-worker which targets the importers. Champ & Attaran, *supra* note 45, at 371.

61. Paris Convention for the Protection of Industrial Property art. 5A, Mar. 20, 1883, 25 Stat. 1372 (as revised July 14, 1967).

62. For more about the controversy behind the sufficiency of the compulsory licenses to punish the non-workers, see Regina A. Loughran, *The United States Position on Revising the Paris Convention: Quid Pro Quo or Denunciation*, 5 FORDHAM INT’L L.J. 411, 430 (1982).

The most outrageous form of non-workers are those who not only fail to bring the patented invention to market but refuse all others who want to purchase licenses. An example of such a non-worker is the patentee in *Continental Paper Bag v. Eastern Paper Bag*:

[N]o machine for practical manufacturing purposes was ever constructed under the . . . patent. The record also shows that the [patentee], so to speak, locked up its patent. It has never attempted to make any practical use of it, either itself or through licenses, and, apparently, its proposed policy has been to avoid this. In this respect it has not the common excuse of a lack of means, as it is unquestioned that the [patentee] is a powerful and wealthy corporation.⁶³

There is very little social justification for granting patent monopolies for an invention the benefits of which the patentee is intent on denying to the public. All forms of the working requirement, even the weakest one, target this type of non-worker. Japan, for instance, will punish patent owners whose “patented invention is not sufficiently and continuously worked for 3 years or longer in Japan.”⁶⁴

A second category of non-workers are those who actually make an effort to bring the patented invention to market, either by themselves or through licensees, but who fail to sell enough to meet the legal standard of sufficiency. China defines the condition of insufficient working as one where “the method or scale employed by the patentee or his licensee in exploiting the patent fails to satisfy the internal needs of the nation with regards to the patented product or patented process.”⁶⁵ France has a similar definition of non-working and will punish a patent owner who “[h]as marketed

63. *Cont'l Paper Bag Co.*, 210 U.S. at 427–28.

64. Tokkyohō [特許法] [Patent Law], Law No. 121 of 1959, art. 83, http://www.wipo.int/wipolex/en/text.jsp?file_id=188310 (Japan). It should be noted that “person[s] intending to work the patented invention” must also have failed to obtain an agreement through “consultations [with the patent owners or exclusive licensees] to discuss granting a non-exclusive license” before the compulsory license can be granted. *Id.*

65. Zhuan li fa shi shi xi ze [专利法实施细则] [Regulations for the Implementation of the Patent Law] (promulgated by the St. Council, June 15, 2001, amended Dec. 30, 2009, effective Jan. 9, 2010), art. 73, 2003 ST. COUNCIL GAZ. 66 (China).

the product that is the subject matter of the patent in a quantity sufficient to satisfy the needs of the French market.”⁶⁶

A third category of non-workers are those who do not, by themselves or through licensees, have the invention manufactured within the country where they obtained their patents. India is one of the countries whose expansive definition of non-working includes the following:

[T]he reasonable requirements of the public shall be deemed not to have been satisfied –

. . . .

(e) if the working of the patented invention in the territory of India on a commercial scale is being prevented or hindered by the importation from abroad of the patented article by –

(i) the patentee or persons claiming under him; or

(ii) persons directly or indirectly purchasing from him; or

(iii) other persons against whom the patentee is not taking or has not taken proceedings for infringement.⁶⁷

Brazil’s Industrial Property Law contains a similar provision:

(1) The following also occasion a compulsory license:

I. non-exploitation of the object of the patent within the Brazilian territory for failure to manufacture or incomplete manufacture of the product, or also failure to make full use of the patented process, except cases where this is not economically feasible, when importation shall be permitted⁶⁸

These are perhaps the most muscular definitions of non-worker currently in existence.

66. CODE DE LA PROPRIETE INTELLECTUELLE [C. PROP. INTELL.] art. L613-11, https://www.legifrance.gouv.fr/content/download/1959/13723/version/3/file/Code_35.pdf (Fr.). It should be noted that a compulsory license can only be granted if there is evidence that “the applicant has been unable to obtain a license from the owner of the patent and that [the applicant] is in a position to work the invention in an effective and serious manner.” *Id.* art. L613-12.

67. The Patents Act, No. 39 of 1970, India Code (2005), § 84(7).

68. Lei No. 9,279, de 14 de Maio de 1996 art. 68, <http://www.wipo.int/wipolex/en/details.jsp?id=515> (Braz.).

The survey above illustrates that the definition of non-worker is unique to each individual patent system and naturally flows from its underlying policy. After all, the definition of the non-worker sets forth the contours of “good” and “bad” uses of patents, which can be understood only in view of what the patent systems are designed to accomplish. The Chinese and French definition of a non-worker reflects a policy to ensure that the domestic market will have enough of the patented products. The Indian and Brazilian definition of a non-worker reflects a prioritization of technology transfer into India and Brazil.⁶⁹

Having reviewed the various forms of the working requirement, we can proceed to analyze which, if any, version of the working requirement would best comport with the constitutional command that the U.S. patent system be used to promote the Progress of American Science and useful Arts.

B. A Working Requirement to Promote the American Manufacture of Inventions

What constitutes the Progress of American Science and useful Arts? The proponents of the commercialization justification of patents have pinpointed one aspect of it. One of the *quid* that society should seek from the *quid pro quo* of patent monopolies is the products embodying the inventions. After all, the measure of an advanced society is partly based on access to the fruits of technology. Clearly, a society that uses the telegraph for communication and washing boards for laundry is not more advanced or more appealing than a society that enjoys the internet and washing machines.

The proponents of a disclosure justification of patents have also identified another important *quid*: the technical documentation of practicing and replicating inventions. A nation could hardly progress in science and from that basis further develop its economy if

69. The keen observer may notice that the definition of non-worker used by a particular nation bears a strong correlation to its economic and industrial strength. On the flip side, the lack of a patent working requirement, until recently, was a sign of dominance. In 1968, every industrialized nation had local working requirements. The only exceptions were the United States and the Soviet Union, the two superpowers who were completely dominant in their respective spheres of influence. Champ & Attaran, *supra* note 45, at 366 n.7.

it purchased all the products of inventive genius without acquiring any of the understanding of the underlying technology. In recognition of this principle, the United Arab Emirates, for instance, aggressively imports knowledge by building satellite campuses of famous universities even though it can already afford the most cutting edge of technology with its oil money.⁷⁰

Similarly, promoting the Progress of American Science and useful Arts should also include having Americans *work* with technology and science. That Americans merely gain access to the end products of inventive genius is a necessary, but not sufficient, condition. We all likely enjoy the benefits of toilet bowls and flat-screen monitors on a daily basis, but common experience informs us that use and access do not make us understand the complexities of forming ceramics into toilet bowls or the details of eliminating ions in high-tech glasses.

Likewise, that Americans have access to technical documents and invention disclosures is a necessary, but not sufficient, condition of the Progress of American Science and useful Arts. Simply reading scientific texts, even with the utmost diligence, does not constitute a true understanding of the underlying science, technology, and real-world practicalities needed for flexible and useful application of the knowledge.

Indeed, U.S. patent law itself recognizes that patent disclosures are not intended to encompass all details concerning the use and manufacture of inventions. As the Federal Circuit explained:

Any process of manufacture requires the selection of specific steps and materials over others. The best mode does not necessarily cover each of these selections. To so hold would turn a patent specification into a detailed production schedule, which is not its function. . . . A step or material or source or technique considered "best" in a manufacturing circumstance may have been selected for a non-"best mode" reason, such as the manufacturing equipment was on hand, certain materials were available, prior relationship with supplier was satisfactory, or other reasons having nothing to do with development of the invention.⁷¹

70. Scott Jaschik, *International Campuses on the Rise*, INSIDE HIGHER ED (Sept. 3, 2009), <http://www.insidehighered.com/news/2009/09/03/branch>.

71. *Wahl Instruments, Inc. v. Acvious, Inc.*, 950 F.2d 1575, 1581 (Fed. Cir. 1991).

But even if the “step or material or source or technique considered ‘best’ in a manufacturing circumstance” cannot feasibly be captured in patent disclosures,⁷² such information is still valuable knowledge—it is the heart of engineering. And it cannot be acquired except from active participation in manufacturing. It is for the same reason that legal academia stresses the importance of “hands on” classes. Few law students would claim to have learned all about the art of advocacy just by reading Justice Scalia’s *Making Your Case: The Art of Persuading Judges* without actually writing briefs and delivering oral arguments.⁷³ A nation likewise cannot be considered to have mastered an invention if the population’s understanding of the invention derives only from reading the relevant technical documents.⁷⁴ In order for American Science and useful Arts to progress, Americans must have the opportunity to work with, delve into, and participate in the manufacture and practice of inventions.

72. The Federal Circuit provides the following explanation of why the best mode doctrine cannot be used to require disclosure or updating of disclosures of the techniques used in manufacturing inventions:

[A] requirement for routine details to be disclosed because they were selected as the “best” for manufacturing or fabrication would lay a trap for patentees whenever a device has been made prior to filing for the patent. The inventor would merely have to be interrogated with increasing specificity as to steps or material selected as “best” to make the device. *A fortiori*, he could hardly say the choice is not what he thought was “best” in some way. Thus, at the point he would testify respecting a step or material or source or detail which is not in the patent, a failure to disclose the best mode would, *ipso facto*, be established.

Id.

73. ANTONIN SCALIA & BRYAN A. GARNER, *MAKING YOUR CASE: THE ART OF PERSUADING JUDGES* (2008).

74. The importance of knowledge acquired from active participation in the manufacture of technology is reflected in the following account of Saab Aeronautics’ proposed deal to sell Gripen fighter jets to Brazil:

“The Brazilians want to acquire knowledge about fighter design, and the best way to do that is not that we tell them but that we do it together,” [the head of Saab Aeronautics] says.

“A very important part of our offer . . . is that we are in a situation where we can offer them to be part of the development of the Gripen for Brazil,” he continues.

Brazilian aircraft manufacturer Embraer could become both a local manufacturer as well as a seller of the fighter jet to other South American countries, he says.

Jorn Madslie, *Saab Fighter Jet Guns for Orders*, BBC NEWS (June 6, 2011), <http://www.bbc.co.uk/news/business-13641934>.

It may be argued that Americans do not need such in-depth contact with inventions if Americans continue to generate the most inventions or at least pioneer the fundamental science underlying the inventions. However, the erosion of the United States as the leading innovator continues and shows no sign of abating. Taking the number of Patent Convention Treaty (PCT) filings as a measure of inventiveness,⁷⁵ we can see in *Figure 1* that the share of filings originating from U.S. inventors is steadily declining, dropping from 41% to 25% in the space of a decade and a half. It is sobering to consider the fact that, not that long ago in 2000, the United States had more PCT filings than all of Germany, China, Japan, and Korea combined.

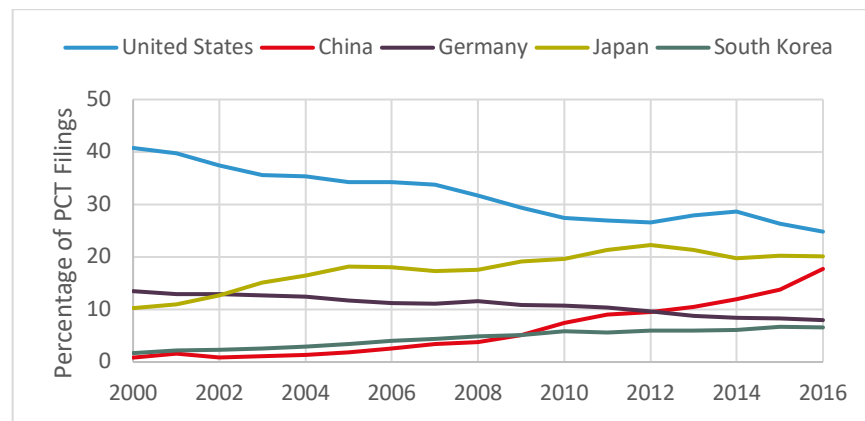


Figure 1. Percentage of PCT filings by the country of residence of the first named applicant. The graph is created from statistics made available by WIPO.⁷⁶

The trends in the number of scientific research publications tell a similar tale. As seen in *Figure 2*, the percentage of publications originating from the United States has steadily fallen and will soon be overtaken by those from China.

75. The PCT offers a mechanism for inventors to simultaneously file applications for patents in multiple jurisdictions.

76. WIPO IP Statistics Data Center, WIPO: WORLD INTELLECTUAL PROPERTY ORGANIZATION, <http://ipstats.wipo.int/ipstatv2/index.htm?tab=pct> (last visited May 5, 2018).

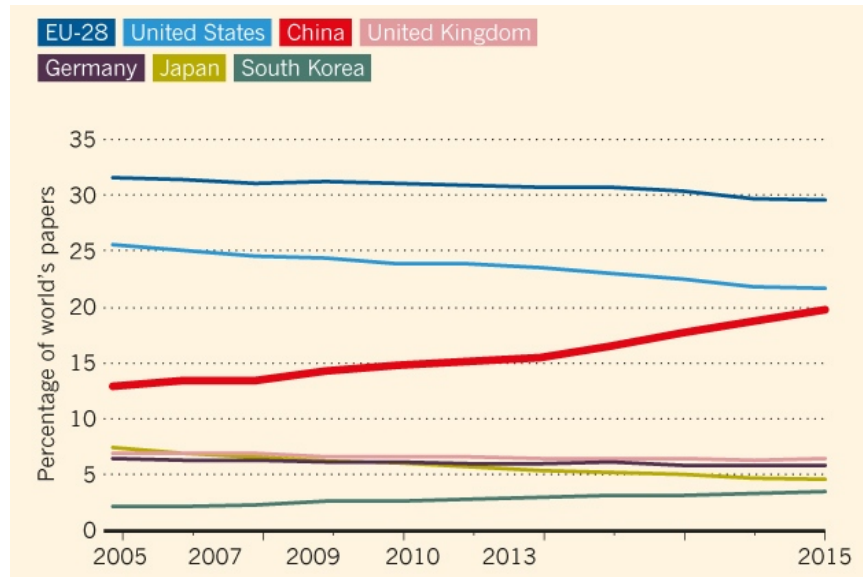


Figure 2. Percentage of scientific publications by the producer of research publications. The graph is taken from *Nature*.⁷⁷

The United States must seriously confront the unpleasant possibility that its technological and scientific dominance is coming to an end. And should the day arrive when the United States is out-invented by its competitors, the least that could be done to ensure the Progress of American Science and useful Arts is to ensure that Americans participate in the manufacture and practice of inventions that they have not invented so that Americans can gain mastery over these inventions and experience from working with the technology. Even if it were less efficient to have inventions manufactured in the United States, the resulting gains in employment, training, and technological transfer might be a price worth the cost of patent monopolies. The patent system would otherwise fail to meet its constitutional mandate if it imposes patent monopolies on a U.S. public that only passively interacts with new technologies through consumption.

77. Richard Van Noorden, *China by the Numbers*, NATURE (June 23, 2016), <http://www.nature.com/news/china-by-the-numbers-1.20122>.

As argued above, the Progress of American Science and useful Arts requires Americans to participate in the manufacture of technology and by such access gain familiarity and knowledge on behalf of the nation. The shape of the working requirement that is needed follows from this principle. A working requirement of the strongest form, similar to Indian and Brazilian counterparts, which targets the non-working patentee who does not manufacture or have licensees manufacture the invention in the United States, is an appropriate and calibrated way to give Americans exposure to technology.

*C. Consistency of a New Working Requirement with Developments
in U.S. Patent Law and Industrial Policy*

The idea of instituting a strong working requirement might seem, on the surface, a retrograde move in the development of U.S. patent law. It must be noted that U.S. patent law did contain a working requirement, from 1832 to 1836, which applied only to aliens.⁷⁸ The Supreme Court provided the following comment about the old working requirement in *Continental Paper Bag*:

We have seen that it has been the judgment of Congress from the beginning that the sciences and the useful arts could be best advanced by giving an exclusive right to an inventor. The only qualification ever made was against aliens in the act of 1832. That act extended the privilege of the patent law to aliens, but required them “to introduce into public use in the United States the invention or improvement within one year from the issuing thereof,”

78. As seen in the subsequent quotation, the Supreme Court in *Continental Paper Bag* deems this provision targeting against aliens, in effect between 1832 to 1836, as the only working requirement ever in existence in U.S. patent law. Most scholars have accepted this view as well. However, it is arguable that U.S. patent law always had a working requirement from the very beginning. As noted in the discussion above, the Patent Act of 1793 and 1800 only allowed citizens or aliens resident within the United States for two years to obtain patent protection. Patent Act of Apr. 17, 1800, ch. 25 § 1, 2 Stat. 37; 21, 1793, ch. 11, § 1, 1 Stat. 318–21. It also had a provision that “every person . . . offending [a patent], shall forfeit and pay to the patentee, a sum, that shall be at least equal to three times the price, for which the patentee has usually sold or licensed to other persons, the use of the said invention.” *Id.* at § 5 (emphasis added). This limitation, as Herbert Hovenkamp has pointed out, meant that “damages were available only if the patent was either in use by the inventor or licensed out to others.” Hovenkamp, *supra* note 58, at 269. These provisions in combination create an effective punishment for patentees who do not make or use the invention within the United States, that is, they constitute a working requirement.

and indulged no intermission of the public use for any period longer than six months. A violation of the law rendered the patent void. The act was repealed in 1836. It is manifest, as is said in Walker on Patents, § 106, that Congress has not “overlooked the subject of non-user of patented inventions.” And another fact may be mentioned. In some foreign countries the right granted to an inventor is affected by non-use. This policy, we must assume, Congress has not been ignorant of nor of its effects. It has, nevertheless, selected another policy; it has continued that policy through many years. We may assume that experience has demonstrated its wisdom and beneficial effect upon the arts and sciences.⁷⁹

Some readers may see a new working requirement as an overly drastic change to U.S. patent law, regardless of its ability to promote the Progress of American Science and useful Arts.⁸⁰

It must be noted that, for whatever “wisdom and beneficial effect” there is to the abolishing of the old working requirement, vestiges of a working requirement have remained within U.S. patent law. For example, Congress has limited access to the International Trade Commission (ITC) as a patent litigation forum to those who can show “an industry in the United States, relating

79. *Cont'l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 429–30 (1908).

80. There may also be concern that the proposed working requirement would constitute a violation of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which states that “patent rights [shall be] enjoyable without discrimination as to . . . whether products are imported or locally produced.” Agreement on Trade-Related Aspects of Intellectual Property Rights, § 5, art. 27(1) [hereinafter TRIPS]. TRIPS was a part of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), which established the World Trade Organization (WTO). Ratification of TRIPS, Annex 1C to the GATT, is a requirement for membership in the WTO. Marrakesh Agreement Establishing the World Trade Organization, art. II(2), Apr. 15, 1994, 1867 U.N.T.S. 154 (“The agreements and associated legal instruments included in Annexes 1, 2 and 3 . . . are integral parts of this Agreement, binding on all Members.”). In 2000, the United States actually challenged the Brazilian working requirement in the WTO on the ground that it violated TRIPS. Champ & Attaran, *supra* note 45, at 380. The WTO never settled the legal question because the dispute was resolved in a political face-saving agreement. *Id.* at 381. It is unclear if the United States still holds to the position, which scholars have concluded was dubious in terms of its legal merits. *Id.* at 390. At any rate, President Trump has called the WTO “a disaster” and has threatened “to renegotiate or . . . pull out.” Geoff Dyer, *Donald Trump Threatens to Pull US out of WTO*, FIN. TIMES (July 24, 2016), <https://www.ft.com/content/d97b97ba-51d8-11e6-9664-e0bdc13c3bef>. The renegotiation or withdrawal of the United States from the GATT is far beyond the scope of this article, which takes no position on the matter. However, the compliance of any working requirement with TRIPS would be a moot point if the United States does withdraw from the GATT, which, as stated above, includes TRIPS.

to the articles protected by the [asserted] patent . . . exists or is in the process of being established.”⁸¹ The availability of an additional forum to sue for patent infringement for those who work their patents reflects a policy, in the words of the Federal Circuit, to “protect[] American industries, including American industries that are built on the exploitation of intellectual property through engineering, research and development, or licensing.”⁸² This bias toward American industries may not be a working requirement with much bite—the punishment for the non-worker is somewhat small and the definition of *non-worker* quite generous to the non-worker—but it is nonetheless a working requirement.

In addition, the Bayh-Dole Act, with a stated policy “to promote the commercialization and public availability of inventions made in the United States by United States industry and labor,”⁸³ actually limits the licensing of “any federally owned invention in the United States only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.”⁸⁴ It also forbids small businesses and non-profit organizations who acquired rights to inventions created in their work for the federal government from granting exclusive licenses to use or sell the invention “unless [the prospective licensee] agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States.”⁸⁵ When this obligation to manufacture within the United States is breached by the exclusive licensee, the law provides that the “[f]ederal agency under whose funding agreement the subject invention was made shall have the right . . . to require the contractor, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants,” or even

81. 19 U.S.C. § 1337(a)(2) (2012). For a discussion of the protectionist motives that led to the creation of the ITC and the controversy surrounding the domestic industry requirement, see Sapna Kumar, *The Other Patent Agency: Congressional Regulation of the ITC*, 61 FLA. L. REV. 529 (2009).

82. *InterDigital Commc’ns, LLC v. ITC*, 707 F.3d 1295, 1304 (Fed. Cir. 2013).

83. 35 U.S.C. § 200 (2012).

84. *Id.* § 209(b).

85. *Id.* § 204.

“to grant such a license itself.”⁸⁶ To the extent that these provisions force licensees of inventions owned by the federal government or by federal contractors to manufacture the inventions in the United States, they also operate as a working requirement.

More importantly, the Supreme Court itself has developed a sort of patent working requirement against non-practicing entities, the pejoratively named “patent trolls.”⁸⁷ In *eBay Inc. v. MercExchange, L.L.C.*, the Court held that “[a]ccording to well-established principles of equity, [patentees] seeking a permanent injunction must satisfy a four-factor test.”⁸⁸ Since the sufficiency of legal damages to compensate and the public interest are two of the four factors within the calculus of the “well-established principles of equity,”⁸⁹ patent trolls that rely on licensing fees to profit from their patent monopolies and that make no particular effort to ensure products reach the market will have greater difficulty, compared to practicing entities, in demonstrating their entitlement to injunctive relief.

However, even before *eBay*, patent trolls were already confined in terms of the legal remedies they could obtain. According to then-existing patent law, “When actual damages, e.g., lost profits, cannot be proved, the patent owner is entitled to a reasonable royalty.”⁹⁰ The patentee needs to show “manufacturing and marketing capability to exploit the demand” for the patented product in order to obtain lost profits.⁹¹ Patent trolls obviously lack the “manufacturing and marketing capability,” and therefore cannot prove lost profits.

86. *Id.* § 203.

87. Trolls can be considered a species of non-worker that not only does not bring patented inventions into the market but does not bring any goods into the market at all. Justice Kennedy provides the following description of their behavior in his concurrence to *eBay Inc. v. MercExchange, L.L.C.*:

An industry has developed in which firms use patents not as a basis for producing and selling goods but, instead, primarily for obtaining licensing fees. For these firms, an injunction, and the potentially serious sanctions arising from its violation, can be employed as a bargaining tool to charge exorbitant fees to companies that seek to buy licenses to practice the patent.

547 U.S. 388, 396 (2006) (Kennedy, J., concurring) (citations omitted).

88. *Id.* at 391 (unanimous opinion).

89. *Id.*

90. *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1157 (6th Cir. 1978).

91. *Id.* at 1156.

Accordingly, shorn of the ability to obtain lost profits or injunctions, patent trolls may be confined to the reasonable royalty as a remedy.⁹² The combined practical effect of these judicial holdings concerning injunctions and damages therefore is an imposition of something that resembles a compulsory license on patents owned by the trolls.⁹³ After all, as stated before, these entities are generally unable to obtain more than a reasonable royalty in court. And what they cannot obtain in court, they cannot threaten when bargaining for licensing fees. Thus, patent trolls are compelled, in court or on the bargaining table, to grant licenses to non-willful infringers at non-extortionate rates.

To be sure, this is not a particularly strong form of a working requirement. The Supreme Court in *eBay* upheld the principle described by the Court in *Continental Paper Bag*, “which rejected the contention that a court of equity has no jurisdiction to grant injunctive relief to a patent holder who has unreasonably declined to use the patent.”⁹⁴ Furthermore, the law as applied targets only patent trolls, as opposed to non-workers of a particular patent. In the words of the Federal Circuit, “In multiple instances, this court has held that a party that does not practice the asserted patent may still receive an injunction when it sells a competing product.”⁹⁵ Accordingly, under the current state of U.S. patent law, non-workers of patents who are not trolls can still obtain an amount greater than that which they would obtain with traditional compulsory licenses because they can demonstrate entitlement to injunctions.

92. The value of the reasonable royalty that non-practicing entities can obtain is itself limited. As Jaideep Venkatesan notes, “[federal] district courts’ decisions . . . have largely denied patentees the compensation that could be attributed to the bargaining leverage provided by injunctions” in the simulated bargaining used to calculate the reasonable royalty. Jaideep Venkatesan, *Compulsory Licensing of Nonpracticing Patentees After eBay v. MercExchange*, 14 VA. J.L. & TECH. 26, 39 (2009).

93. As Judge Rader explains in his concurrence to *Paice LLC v. Toyota Motor Corp.*, a true compulsory license would be one that is issued with the authority of the U.S. government, for example, by a court, without the ability of the parties to bargain for the terms of the license. 504 F.3d 1293, 1316–17 (Fed. Cir. 2007).

94. *eBay*, 547 U.S. at 393 (citing *Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 422–30 (1908)).

95. *Trebro Mfg., Inc. v. FireFly Equip., LLC*, 748 F.3d 1159, 1171 (Fed. Cir. 2014) (providing examples).

Nonetheless, as seen in Justice Kennedy's concurrence to *eBay*, current U.S. patent policy considers "[a]n industry . . . in which firms use patents not as a basis for producing and selling goods" as a problem to be dealt with.⁹⁶ As of this writing, at least twenty-seven of the fifty states have passed legislation targeting patent trolls.⁹⁷ Many patent scholars also call for measures similar to working requirements to target these trolls.⁹⁸ Given this public disapproval of trolls, it may not be excessive to also target firms that do not use U.S. patents as a basis for producing goods in the United States and that do not help Americans participate in the manufacture of technology. The jump from the *eBay* framework in which trolls are subject to quasi-compulsory licenses to a full-scale working requirement targeting non-workers of patents is not only logical but is also not as radical as it may first appear.

Furthermore, a new working requirement is consistent with the new U.S. industrial policy to "buy American and hire American." As President Trump explained in his inaugural speech:

Every decision on trade, on taxes, on immigration, on foreign affairs, will be made to benefit American workers and American families.

We must protect our borders from the ravages of other countries making our products, stealing our companies, and destroying our jobs. Protection will lead to great prosperity and strength.⁹⁹

It is not difficult to understand why there is a renewed interest in manufacturing in the United States. The United States has

96. *eBay*, 547 U.S. at 396 (Kennedy, J., concurring).

97. Jonathan Griffin, *2015 Patent Trolling Legislation*, NAT'L CONF. ST. LEGISLATURES (June 15, 2016), <http://www.ncsl.org/research/financial-services-and-commerce/2015-patent-trolling-legislation.aspx>.

98. Oskar Liivak, for example, urges that non-practicing patentees be limited to nominal damages when suing independent inventors. Oskar Liivak, *When Nominal Is Reasonable: Damages for the Unpracticed Patent*, 56 B.C. L. REV. 1031, 1064 (2015). Interestingly enough, Liivak does not see his proposal as a working requirement. *Id.* at 1062 n.162. However, to the extent that it does effectively punish the non-working of patents, his proposal is functionally a working requirement, even though it is by no means as muscular as the working requirement suggested within this Article.

99. Donald J. Trump, President of the United States, Inaugural Address, January 20, 2017, 2017 DAILY COMP. PRES. DOC. 2 (Jan. 20, 2017), <https://www.gpo.gov/fdsys/pkg/DCPD-201700058/pdf/DCPD-201700058.pdf>.

hemorrhaged almost five million manufacturing jobs between 2000 and 2016, a decline of roughly thirty percent.¹⁰⁰ The result is poverty, despair, and an epidemic of suicide and drug addiction in hard-hit areas.¹⁰¹ The working requirement considered here, which promotes manufacturing within the United States, is entirely consistent with the desire to reverse the trend.

To that end, a new working requirement is a particularly suitable policy tool for effectuating these industrial objectives. First, because each patent needs to pass muster under the novelty and obviousness standards, patents, by definition, involve the manufacture of innovative goods. The manufacture of non-innovative goods is undoubtedly important, but Americans should also be involved in manufacturing the latest technology. As noted in President Trump's National Security Strategy:

[T]he American network of knowledge, capabilities, and people—including academia, National Laboratories, and the private sector— . . . turns ideas into innovations, transforms discoveries into successful commercial products and companies, and protects and enhances the American way of life. The genius of creative Americans, and the free system that enables them, is critical to American security and prosperity.¹⁰²

Having Americans learn about technology through manufacturing the latest technological innovations strengthens the United States.

Second, an earlier study found that, to the extent the U.S. patent system “speaks” through patent litigation, the system has little correlation with the economic and trade activities of the United States.¹⁰³ The data show quite clearly that patents, as litigated, largely implicate a narrow set of industrial sectors, primarily those

100. *Databases, Tables & Calculators by Subject*, U.S. DEPT. LAB., BUREAU LAB. STAT., <https://data.bls.gov/timeseries/CES3000000001> (last visited May 5, 2018).

101. See Victor Tan Chen, *All Hallowed Out: The Lonely Poverty of America's White Working Class*, ATLANTIC (Jan. 16, 2016), <https://www.theatlantic.com/business/archive/2016/01/white-working-class-poverty/424341/>; Deirdre Fernandes, *As Jobs Left the US, Suicides Rose*, BOS. GLOBE (Dec. 27, 2016), <https://www.bostonglobe.com/business/2016/12/26/suicide-rates-rise-after-jobs-move-overseas-new-study-funds/yVhFkZOSlgnODKEjTfcDTK/story.html>.

102. NATIONAL SECURITY STRATEGY OF THE UNITED STATES OF AMERICA, *supra* note 57, at 21.

103. Timothy Lau, *An Economic Analysis of the Patent Dockets of Prominent Patent Venues*, 97 J. PAT. & TRADEMARK OFF. SOC'Y 495 (2015).

referred to under the North American Industry Classification System as “Computer & Electronic Products” and “Chemical Products.”¹⁰⁴ These sectors involve a relatively small amount of the U.S. workforce and of the value added within the United States. This suggests that there is plenty of room for patent law, through the operation of a working requirement, to stimulate U.S. manufacturing within these important industrial sectors.

Third, a patent working requirement has advantages over other policy tools like tariffs¹⁰⁵ and public shaming, which President Trump has employed or is considering to encourage manufacturing within the United States. For example, the working requirement avoids the arbitrariness involved in picking specific industrial sectors to grow or particular corporations to target. The working requirement is implicated only when someone seeks to bring a product to the market and is impeded by the patent of a non-worker. The operation of the working requirement therefore relies on private decisions, determined by market considerations, and is relatively economically efficient.

Also, while the working requirement and tariffs both lead to higher prices for U.S. consumers, the requirement alone guarantees that higher prices actually contribute to the desired goal of boosting manufacturing jobs. Because the working requirement takes effect only when there is U.S. manufacturing activity, any increase in prices resulting from the requirement comes with some increase in U.S. manufacturing. In contrast, with tariffs, manufacturers may find it more cost-effective to simply pay tariffs and continue importing rather than manufacture the goods domestically. In this situation, tariffs end up as a tax burden on consumers. The public collects the benefit of tariffs through tax revenue, but there is no way to ensure that the higher prices resulting from the tariff system directly result in increased manufacturing within the United States.

Finally, instituting a working requirement, compared to a muscular tariff policy, is much less likely to harm the economic

104. “Chemical Products” includes pharmaceutical industries.

105. The word “tariffs” is used loosely here to include trade-related policy tools such as quotas, embargos, countervailing duties, etc. Tariffs and intellectual property law are closely intertwined. Tariffs are ultimately a measure of protectionism, and intellectual property law can, although not necessarily, be structured to act in a protectionist manner. A working requirement of the form proposed in this article is protectionist and aligns with a strong tariff policy, even though the underlying mechanics are different.

position and disrupt the existing trade networks of the United States. To begin with, the United States would not have to renegotiate or withdraw from the GATT or, in other words, leave the WTO to institute a working requirement. The major economic competitors of the United States, who also are members of the WTO, already have a working requirement in one form or another;¹⁰⁶ they would have little room to complain about the failure of the United States to comply with the GATT if the United States institutes a working requirement within its own patent law.

Moreover, there is no risk that a working requirement could trigger rounds of reciprocal tariff rate hikes, known in the popular media as a “trade war,” which may result from a muscular tariff policy.¹⁰⁷ Competitors of the United States do not have much room to reciprocate against a new U.S. patent working requirement because they already have working requirements. The most they could do in response, if the United States instituted a muscular definition of the non-worker according to this proposal, is strengthen the definition of the non-worker within their own working requirements.¹⁰⁸ Indeed, nations like Brazil and India, who

106. The working requirements of France, Japan, China, India, and Brazil have already been discussed. Germany, the United Kingdom, and South Korea all have working requirements as well. Patentgesetz [PatG] [Patent Act], Dec. 16, 1980, BGBl 1981 I at 1, last amended by Gesetz [G], Apr. 4, 2016, BGBl I at 558, § 24 (Ger.), <http://www.wipo.int/edocs/lexdocs/laws/de/de/de208de.pdf>; Patents Act 1977, c. 37, § 48 (Eng.), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/580337/patentsact1977011014.pdf; Teukeobeop [Patent Act], Act No. 950, Dec. 31, 1961, amended by Act No. 11962, July 30, 2013, art. 107 (S. Kor.).

107. S.K., *What Might a Trade War Between America and China Look Like?*, ECONOMIST: ECONOMIST EXPLAINS (Feb. 5, 2017), <http://www.economist.com/blogs/economist-explains/2017/02/economist-explains-2>. It can be argued, as of this writing, the beginning punches have already been thrown. In January of 2018, the United States imposed steep tariffs on imported washing machines and solar cells. Press Release, Office of the U.S. Trade Representative, President Trump Approves Relief for U.S. Washing Machine and Solar Cell Manufacturers (Jan. 2018), <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/january/president-trump-approves-relief-us>. Within two weeks, China launched a trade investigation against alleged U.S. dumping and subsidies of sorghum, which may result in tariffs and duties. Sui-Lee Wee, *China's Trade Investigation Takes Aim at Trump's Voter Base*, N.Y. TIMES (Feb. 5, 2018), <https://www.nytimes.com/2018/02/05/business/china-us-trade-sorghum.html>. It is possible that at the time of publication the United States will be engaged in a full-blown trade war with China, the European Union, and other countries.

108. The customary international law concept of countermeasures is, in the context of international trade, referred to as “suspension of concessions or other obligations” and is explicitly provided for in Article 22 of Annex 2 of the Marrakesh Agreement Establishing the World Trade Organization. Understanding on Rules and Procedures Governing the

already have strong working requirements, would have little ability to respond.

Moreover, the United States would not be harmed by a global strengthening of patent working requirements. To the extent that corporations already choose to establish factories to produce their latest inventions in China, for example, the moderate Chinese patent working requirement is already sufficient. A stronger Chinese patent working requirement would not take more manufacturing jobs from the United States. In contrast, because the United States currently suffers from weak manufacturing, a strong U.S. working requirement could potentially bring manufacturing of the latest technology into the United States.

A trade war, however, is characteristically different in character. In a trade war, there is no limit on the scope of impacted industrial sectors and goods.¹⁰⁹ Therefore, each nation could retaliate against the United States for implementing a strong tariff policy until there is simply no trade at all. China could, for example, respond to U.S. tariffs on imports of mobile phones with their own tariffs on imports of soybeans.¹¹⁰ The result is likely to prove

Settlement of Disputes, Apr. 15, 1994, 1869 U.N.T.S. 401. The rule of proportionality of countermeasures is captured within Article 22(4), which states that “[t]he level of the suspension of concessions or other obligations . . . shall be equivalent to the level of the nullification or impairment.” *Id.* To the extent that a new U.S. patent working requirement could be deemed a “nullification or impairment,” any lawful countermeasure imposed by other countries must “be equivalent” in “level.” The natural countermeasure for nations with weak working requirements is to strengthen their working requirements to match the “level” of the new U.S. patent working requirement. Nations that already have strong working requirements have no lawful countermeasure. They would not be able to claim entitlement to countermeasures without admitting that their own working requirements are a “nullification or impairment.”

109. In accordance with Article 27(1) of TRIPS, patents can be granted for inventions that are novel, non-obvious, and useful. These substantive limitations mean that patents cover a much smaller amount of goods than tariffs. For example, a tariff over beef implicates *all* beef. Patent protection cannot implicate *all* beef. Patent protection may touch on the novel and non-obvious aspects of modern beef production, but it stands to reason that beef from cows raised in the traditional way will not be novel or non-obvious and therefore will not fall within the scope of patents.

110. Other potential targets for trade countermeasures against U.S. tariffs include sorghum, bourbon, cheese, and orange juice. Scott Horsley, *Kentucky Bourbon, Wisconsin Cheese Could Be Targets in Trade War*, NPR (Feb. 21, 2018, 5:00 AM), <https://www.npr.org/2018/02/21/587379391/kentucky-bourbon-wisconsin-cheese-could-be-targets-in-trade-war>; Matt Rivers, *A Massive US Farming Industry Fears China Trade Trouble*, CNN MONEY (Feb. 21, 2018, 7:48 AM), <http://money.cnn.com/2018/02/21/news/economy/china-us-soybeans-trade-trump/index.html>.

economically disastrous and painful for certain segments of the American population whose livelihoods depend on export trade, particularly farmers and ranchers, even if the United States is able to increase manufacturing and claim an overall victory in such a war.¹¹¹ New factories for mobile phones might balance out the jobs lost in soybean farms, but the transition from soybean farming to mobile phone manufacturing may not be smooth or easy for the farmers involved. A race around the world to strengthen patent working requirements, even if it were to occur, is unlikely to cause that sort of economic dislocation.¹¹²

In sum, a new working requirement fits squarely within existing developments in U.S. patent law and comports with the industrial objectives of the United States to increase domestic manufacturing. There is no doubt that a new working requirement would be a significant shift within the U.S. patent system, but it is certainly not an overly strong prescription to steer the U.S. patent system back toward its constitutional purpose.

IV. MAKING THE WORKING REQUIREMENT WORK

To flesh out the working requirement, I start from the basic form targeting importing patentees as non-workers. That is, where there are applicants who (A) seek to manufacture in the United States inventions covered by patents they do not own, (B) can satisfactorily show that they are in a position to manufacture the patented invention in the United States in an effective and serious manner,¹¹³ and (C) are unable to obtain licenses from the patentees,

111. Catherine Boudreau, *The Trade War Comes to the Prairie*, POLITICO (Feb. 15, 2017, 5:16 AM), <http://www.politico.com/agenda/story/2017/02/trade-war-rural-voters-000312>.

112. At least within the United States, patents implicating the “Agriculture, Forestry, Fishing and Hunting” sector, as defined under the North American Industry Classification System, constitute a relatively small portion of the overall patent docket. Lau, *supra* note 103, at 501. It is likely that foreign patents will show the same trend. *See supra* note 97. The ability of a competitor to negatively impact U.S. agricultural exports by strengthening its patent working requirement is likely to be small.

113. CODE DE LA PROPRIETE INTELLECTUELLE [C. PROP. INTELL.] (INTELLECTUAL PROPERTY CODE) art. L613-11 (Fr.). This requirement is not different in spirit from the requirement of the Bayh-Dole Act that any person who seeks a license to a federally owned invention must “suppl[y] the [relevant] agency with a plan for development or marketing of the invention” and “make[] a commitment to achieve practical application of the invention within a reasonable time.” 35 U.S.C. § 209(a)(3), (f) (2012).

the decision-making authority¹¹⁴ may grant a compulsory licenses to the applicants if the patentees have failed to have the invention manufactured either personally or through licensees in the United States.¹¹⁵

A reasonable amount of time sufficient for patentees or their licensees to have developed their own U.S. manufacturing capabilities should have elapsed since their patent was issued before applicants are allowed to obtain compulsory licenses. Article 5A(4) of the Paris Convention provides a good international standard:

A compulsory license may not be applied for on the ground of failure to work or insufficient working before the expiration of a period of four years from the date of filing of the patent application or three years from the date of the grant of the patent, whichever period expires last; it shall be refused if the patentee justifies his inaction by legitimate reasons.¹¹⁶

However, aside from the basic objective of exposing Americans to technology through participation in the manufacture of inventions, a good working requirement must take into account considerations of efficiency and must be designed to prevent abuse. To that end, I will propose some modifications to the basic form of the working requirement set forth above.

114. As I argued in the remainder of the article, certain highly technical factors should be taken into account in the granting and pricing of compulsory licenses. It therefore seems that the USPTO or the ITC would be in a better position than the federal courts to act as the decision-making authority. Decisions concerning the grant of compulsory licenses could be reviewed by the Federal Circuit, just like other decisions concerning patents made by these agencies.

115. The working requirement proposed here is, unlike its French and Chinese counterparts, not intended to punish a patentee who is manufacturing within the United States but is unable to supply the entire market. Small businesses should be given a chance to scale up over time, or to fail, without the threat of a larger corporation with superior domestic manufacturing capabilities swooping in to obtain compulsory licenses and essentially hijacking their patents. The end result may be fewer domestic manufacturing jobs created, but, as President Obama noted, “[I]n this new economy, workers and startups and small businesses need more of a voice, not less. The rules should work for them.” Barack H. Obama, President of the United States, Address Before a Joint Session of the Congress on the State of the Union, January 12, 2016, 2016 DAILY COMP. PRES. DOC. 4 (Jan. 12, 2016), <https://www.gpo.gov/fdsys/pkg/DCPD-201600012/pdf/DCPD-201600012.pdf>.

116. Paris Convention for the Protection of Intellectual Property, *supra* note 61.

*A. Threshold of U.S. Manufacturing*¹¹⁷

The working requirement ought not be so strict as to demand that patentees or their licensees manufacture all of the products embodying their invention within the United States. Suppose, for example, a case in which a patentee has two lines of products, processor *A* and RAM *B*, both of which embody circuitry technology she has patented. Suppose too that she finds it more efficient to manufacture processor *A* in the United States and to manufacture RAM *B* in South Korea. It would seem unfair to the patentee to grant a compulsory license, on the grounds that she cannot achieve 100% domestic manufacturing, to a competitor who would then manufacture processor *C* to compete with processor *A*. We can also envision a situation in which the patentee simply cannot manufacture the products within the United States because, for example, she cannot source the raw materials needed within the United States. So while the threshold manufacturing requirement should not be too high, it should not be so low as to allow patentees to manufacture only a token amount in the United States while importing the bulk majority.

The approach articulated by the High Court of Judicature in Bombay about the Indian patent working requirement, in a case concerning the generic manufacture of cancer medicine, is particularly instructive here:

The guidelines viz. Section 83 of the [Patent] Act in particular states that the patent is not granted so as to enable the patent

117. The word “manufacturing” is used loosely to refer to the act of making goods and providing services and is a strict, technical reference to the “manufacturing sector,” defined under the North American Industry Classification System as “compris[ing] establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products.” *Manufacturing: NAICS 31-33*, U.S. DEPT. LAB., BUREAU LAB. STAT., <https://www.bls.gov/iag/tgs/iag31-33.htm> (last visited May 5, 2018). Many patents are ultimately concerned with activity outside of this sector, and it is improper to lump all patents within its ambit. Lau, *supra* note 103, at 497–98. Nonetheless, the concept of a threshold applies to a patent even when it is not classifiable within the “manufacturing sector.” *Id.* at 489. Let us consider, for example, U.S. Patent No. 6,174,237, entitled “Method for a Game of Skill Tournament,” which was asserted against Game Show Network and Worldwinner.com for offering an infringing online game on their websites. *Stephenson v. Game Show Network, LLC*, 933 F. Supp. 2d 674 (D. Del. 2013). With reference to such a patent, the threshold of the working requirement could be thought of as requiring that some portion of the servers providing the gaming service, to the extent such service is provided to U.S. customers, be based in the United States.

holder to enjoy a monopoly with respect to the importation of the patented article. Thus it would presuppose that some efforts to manufacture in India should also be made by the patent holder. . . . Manufacture in all cases may not be necessary to establish working in India However, the patent holder would nevertheless have to satisfy the authorities under the Act as to why the patented invention was not being manufactured in India keeping in view Section 83 of the Act. This could be for diverse reasons but it would be for the patent holder to establish those reasons which makes it impossible/prohibitive for it to manufacture the patented drug in India. However, where a patent holder satisfies the authorities, the reason why the patented invention could not be manufactured in India then the patented invention can be considered as having been worked in the territory in India even by import. This satisfaction of the authorities is necessary particularly when the [patent holder] has manufacturing facilities in India.¹¹⁸

When or whether the threshold of manufacturing is achieved should be decided on a case-by-case basis. It would be impractical to set a fixed rule across all industries and across all sets of circumstances concerning the needed ratio of imported inventions to U.S. manufactured inventions. However, it seems fair that patentees should be entitled to a presumption of having satisfied the working requirement if they and their licensees manufacture in the United States at least twenty-five percent of all the units of products embodying their inventions that they sell in the United States. Alternatively, the detailed rule set forth in 14 C.F.R. § 1274.911(9) by the National Aeronautics and Space Administration may serve as a useful threshold.¹¹⁹

118. Bayer Corp. v. Union of India, 47-49 (Bombay HC 2014), Writ Petition No. 1323 of 2013, July 15, 2014 (Bombay H.C.), at 47-49, available at <http://www.lawyerscollective.org/wp-content/uploads/2014/12/bombay-high-court-judgment.pdf>.

119. The Bayh-Dole Act uses the language of “manufactured substantially in the United States” to regulate the licensing of patents owned by the federal government or by federal contractors who created the subject invention in the course of their work for the government. 35 U.S.C. §§ 204, 209(b) (2012). The law essentially gives individual federal agencies the discretion to decide what is “manufactured substantially in the United States.” See *id.* §§ 203, 209. To the best of my knowledge, only the National Aeronautics and Space Administration (NASA) has promulgated an explicit definition:

Manufactured substantially in the United States means the product must have over 50 percent of its components manufactured in the United States. This

Both applicants and patentees ought to be able to overcome the presumption by appropriate proof to the decision-making authority, governed by the rule of reason. Patentees who manufacture a small percentage of their patented inventions in the United States may, for instance, be determined to have satisfied the working requirement when large numbers of U.S. employees participate in the manufacture of the technology.

B. Satisfying the Working Requirement with U.S. Manufacturing of “Competing” Products to the Patented Invention

In the real-world, patentees sometimes obtain patents over inventions but, instead of manufacturing the patented inventions, manufacture other products not covered by the patents but which can be regarded as related to the inventions.¹²⁰ Courts have encountered this scenario when patentees seek lost profits or injunctions based on harm by infringing products to the demand of the products they actually manufacture. The Federal Circuit has held that patentees can claim both lost profits and also assert irreparable harm even though they do not actually manufacture their patented

requirement is met if the cost to the Recipient of the components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all components required to make the product. (In making this determination only the product and its components shall be considered.) The cost of each component includes transportation costs to the place of incorporation into the product and any applicable duty (whether or not a duty-free entry certificate is issued). Components of foreign origin of the same class or kind for which determinations have been made in accordance with FAR 25.102(a)(3) and (4) are treated as domestic. Scrap generated, collected, and prepared for processing in the United States is considered domestic.

14 C.F.R. § 1274.911(9) (2018). The manufacturing threshold within the rule seems to be drafted for large and complex products with multiple components, which is unsurprising given the role and responsibilities of NASA in space exploration and aerospace research. It may not be appropriate for smaller and simpler inventions.

120. Reasons for this phenomenon include market dynamics or even mistake. *See, e.g.,* Presidio Components, Inc. v. Am. Tech. Ceramics Corp., 702 F.3d 1351, 1357 (Fed. Cir. 2012) (involving a patentee that manufactures something it believed was covered by invention when it actually was not); Broadcom Corp. v. Qualcomm Inc., 543 F.3d 683, 702–03 (Fed. Cir. 2008) (demonstrating the dynamics of the phone chip markets may result in patentees not making all of the products they patented).

inventions.¹²¹ The touchstone is that the products that the patentees make are “competing” against the patented products.¹²²

These considerations also inform the design of a new working requirement. Patentees should not be considered as having failed to meet the domestic manufacturing requirement when, for one reason or another, they instead decide to manufacture products “competing” against their own patented inventions. After all, the working requirement is aimed at increasing domestic manufacturing. As long as the patentees are manufacturing products in the United States, meeting the threshold of manufacturing discussed earlier, they have already in part or in full met the goals of the working requirement. Therefore, the working requirement should permit patentees to show that they have met the working requirement by reference to products they make in the United States that “compete” against their patented inventions.¹²³

C. Rights of the Compulsory Licensees and of the Patentee

Assuming that the manufacturing costs are lower in foreign countries than in the United States, compulsory licenses for manufactures of inventions in the United States are unlikely to concern patentees if they continue to possess the right to import their inventions from abroad. Patentees can deter any potential compulsory licensees with the mere threat of a price war. Worse yet, the fact that licensees must pay fees for compulsory licenses means that they would encounter an uphill battle to bring their U.S. manufactured goods to market even if their manufacturing costs in the United States and the patentees’ manufacturing costs abroad were equal.

121. *Trebro Mfg., Inc. v. FireFly Equip., LLC*, 748 F.3d 1159, 1171 (Fed. Cir. 2014); *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1548–49 (Fed. Cir. 1995) (en banc).

122. *Trebro*, 748 F.3d at 1171; *Presidio*, 702 F.3d at 1360.

123. It should be noted that, just because patentees can satisfy the working requirement by showing that they are manufacturing products that compete against their patented inventions, the competing products are not themselves protected from copying by the working requirement. Unless patentees hold separate patents to cover the competing products, nothing prevents others from manufacturing and selling copies of the competing products. What the others are not allowed to do, under this scheme, is to obtain compulsory licenses to make the patented inventions.

To give teeth to the working requirement then, it is necessary that the grant of a compulsory license come with a concurrent entitlement, not to hold the patent unenforceable¹²⁴ but to enjoin patentees from importing their own patented inventions. Such a provision would protect compulsory licensees against patentees' cheaper imports from deterring licensees' access to the market.

However, competitors of patentees who have no intention of manufacturing the patented inventions may take advantage of this power to enjoin patentees from importation only to force them from the market or to drive up their manufacturing costs. To prevent this type of abuse, injunctions against the patentees' imports should start on the day the compulsory licensees' own tooling and assembly lines are ready for the U.S. manufacture of the patented inventions.¹²⁵ This delayed start of the injunctions also serves to obviate the impact on patentees when the decision-making authority in the initial grant of the compulsory license misjudged the ability or the commitment of the applicants to actually manufacture the inventions in the United States. After all, should the applicants for the compulsory licenses never succeed in readying their U.S. manufacturing capabilities, there is no practical effect on the patentees' importation at all.

Once the compulsory licensees begin manufacturing in the United States and successfully enjoin the patentees' importation, it would be necessary to protect the compulsory licensees from importation by the patentees' other (non-compulsory) licensees and by infringers. To that end, patents must continue to be enforceable. However, because patentees would have diminished motivation to enforce their patents in court, any and all compulsory licensees should be armed with the ability to enjoin the patentees' other licensees and infringers who import the patented inventions. The compulsory licensees should also be permitted to collect damages

124. Holding the patent unenforceable for failure to work would be a violation of Article 5A(1) of the Paris Convention.

125. Proof of readiness of tooling and assembly lines needed to obtain the injunction against the patentee's imports should be distinguished from proof of position to manufacture in an effective and serious manner needed to obtain a compulsory license. Position to manufacture in an effective and serious manner should be demonstrated by such factors as the quality of the manufacturing proposal, past manufacturing experience, strength of credit line and financial backing, and plausibility of supply chain. Tooling and assembly lines will be convincing, but not necessary, proof of position to manufacture in an effective and serious manner.

from the importers, and the amount should be divided pro rata based on the number of units each of the compulsory licensee-plaintiffs has manufactured in the United States and has sold anywhere in the world.

Patentees should nonetheless retain the right to prevent compulsory licensees from importing patented inventions. After all, the same concerns about patentees that motivate the earlier discussion about the threshold of U.S. manufacturing also apply to compulsory licensees, since compulsory licensees may try to manufacture a token amount of the patented inventions in the United States while importing the rest. Therefore, when compulsory licensees do not personally meet the threshold of U.S. manufacturing, patentees should be entitled to apply for a cancellation of compulsory licenses and for the restoration of their ability to import their patented inventions.

D. Non-Exclusivity of the Compulsory License

According to Article 31 of the Trade-Related Aspects of Intellectual Property Rights (TRIPS), where “the law of a Member allows for other use of the subject matter of a patent without the authorization of the right holder . . . such use shall be non-exclusive.” It is probably wise for a new working requirement to comply with this provision of TRIPS.¹²⁶

This is necessary, first of all, to protect U.S. consumers. While forcing manufacture of patented inventions in the United States has the likely effect of driving up prices and imposing costs associated with inefficiencies of manufacturing in the United States relative to the world, U.S. consumers should not be made to tolerate exclusive compulsory licensees who are inefficient relative to other potential U.S. manufacturers or who use their power to enjoin patentees’ imports to charge consumers extortionate prices for inventions that the licensees did not invent. Therefore, other applicants, who may be more efficient than the original applicant as manufacturers in the United States, ought to be permitted to obtain compulsory licenses

126. TRIPS, *supra* note 80, art. 31 (footnote omitted). The need of the United States to comply with TRIPS hinges on its status as a member of the WTO. For a description of the relationship between TRIPS and the WTO and of the possibility that President Trump may renegotiate GATT or withdraw the United States from the WTO, see *supra* note 80.

as well so that they can manufacture inventions in the United States and improve market competitiveness.

Second, that compulsory licenses are non-exclusive is helpful in protecting patentees, who otherwise may be forced by this working requirement to rely on incompetent compulsory licensees to derive income from the U.S. market. By opening up access to compulsory licenses to all applicants who can manufacture and market the inventions in the United States, the compulsory licensees would be forced to maximize their production efficiencies and exploitation of the market to prevent entry of more licensees. Moreover, under this scheme, the number of products embodying the inventions will reach the largest number the compulsory licensees can profitably sell, and the patentees will then be able to generate the maximum payoff from the set rate of the compulsory licensing fees.

*E. Patentees' Change of Mind with Regard to Manufacturing in the United States*¹²⁷

The passages above examined the grant of an injunction against the patentees' importation of the patented inventions when potential compulsory licensees demonstrate their readiness to manufacture in the United States. However, such an injunction does not prohibit patentees from manufacturing the patented inventions in the United States to compete with the compulsory licensees. Indeed, it is the very objective of the working requirement that patentees be incentivized, by the threat of a compulsory license grant to their competitors, to begin their own manufacturing in the United States.

Nonetheless, patentees must be deprived of their ability to cancel compulsory licenses already granted by the decision-making

127. It may be argued that the provisions urged in this section violate Article 31(c) of TRIPS, which states that "the scope and duration of such use [of the subject matter of a patent without the authorization of the right holder] shall be limited to the purpose for which it was authorized." TRIPS, *supra* note 80, art. 31(c). Certainly, the restrictions on patentees that persist after they have repented subsequent to the grant of compulsory licenses and after they have begun manufacture in the United States are onerous. However, the features proposed here are limited in the sense that they are limited to the purpose of ensuring that patented inventions are manufactured in the United States. To the best of my knowledge, there has not been a WTO interpretation of this language within TRIPS, so it is difficult to conclude whether such restrictions would be TRIPS-compliant.

authority.¹²⁸ Licensees who, in reliance on their compulsory licenses, invest large sums in the manufacture and marketing of patented inventions in the United States ought to maintain the right to continue their businesses. In such cases, patentees who change their mind about manufacturing in the United States must rely on their competitive advantage to compete against their compulsory licensees.

While this is a punishment for patentees' initial failure to satisfy the working requirement, they do have a built-in advantage compared to their licensees in that patentees do not have to pay licensing fees to manufacture the patented inventions. Patentees should, nonetheless, be able to fairly petition the decision-making authority to desist from further grants of compulsory licenses to more competitors. It should be sufficient punishment that patentees lost their patent monopolies, so the number of patent oligopolists that patentees must compete against should be capped when they begin manufacturing in the United States.

A policy to encourage patentees to change their minds about manufacturing products embodying their inventions in the United States should take into account the likelihood that patentees will likely not be on good terms with their compulsory licensees. After all, since both the potential applicants and the patentees have strong incentives to agree to exclusive licenses before the applicants obtain compulsory licenses, the fact that compulsory licenses were eventually granted implies some strong disagreement or breakdown in the negotiations. Where patentees are free to grant their own licenses in competition with the compulsory licenses from the decision-making authority, they may be tempted to grant licenses cheaper than the compulsory licenses and spite their compulsory licensees by creating competitors who have lower manufacturing costs.

To that end, patentees, should they be repentant about their importation of their patented inventions, ought to be made to manufacture the patented invention in the United States themselves and be deprived of the ability to manufacture by proxy in the United States through (non-compulsory) licensees. Alternatively, if patentees

128. As discussed earlier, cancellation of the compulsory licenses should still be permitted if compulsory licensees fail to meet the U.S. manufacturing threshold.

retain the ability to grant additional (non-compulsory) licenses to manufacture their patented inventions in the United States, the compulsory licensees must have the power to petition the decision-making authority to lower the rates of the compulsory licenses to the lowest licensing rates set by the patentees themselves.

F. A Small Business Exception

A working requirement should also take into consideration the practical difficulties facing small businesses that are unable to manufacture their products in the United States. As of now, small businesses that cannot manufacture products themselves often are unable to contract manufacturers that could make their products in the United States for them.¹²⁹

Until this reality changes, it may be necessary to include an exemption within the working requirement for small businesses that either have made a good faith effort to contract a domestic manufacturer or that, because of their size, cannot reasonably be expected to comply with the working requirement.

G. Relationship Between the Working Requirement and Prior User Rights

Title 35 U.S.C. § 273 sets forth the “Defense to Infringement Based on Prior Commercial Use,” known more commonly as “prior user rights:”

(a) IN GENERAL. — A person shall be entitled to a defense . . . with respect to subject matter consisting of a process, or consisting of a machine, manufacture, or composition of matter used in a manufacturing or other commercial process, that would otherwise infringe a claimed invention being asserted against the person if —

(1) such person, acting in good faith, commercially used the subject matter in the United States, either in connection with an internal commercial use or an actual arm’s length sale or other arm’s length commercial transfer of a useful end result of such commercial use; and

129. Jennifer Alsever, *Smaller Businesses Struggle to Make It in the U.S.A.*, FORTUNE (Oct. 30, 2014), <http://fortune.com/2014/10/30/small-business-manufacturing-usa/> (discussing how small businesses seeking partners to manufacture products in the United States encounter “frustrating searches, unreturned phone calls, and prohibitive costs”).

(2) such commercial use occurred at least 1 year before the earlier of either –

(A) the effective filing date of the claimed invention; or

(B) the date on which the claimed invention was disclosed to the public in a manner that qualified for the exception from prior art under section 102(b).¹³⁰

It is important to ensure that prior user rights are not used to evade the implications of the working requirement. After all, with prior user rights, firms might resort to trade secret protection for inventions they would otherwise patent. In doing so, even though they could not exclude competitors with patent monopolies, they could still rely on their prior user rights to continue importing their inventions if and when some other inventor subsequently patents what they have earlier invented.

There are two potential solutions to the problem. One is to require anyone asserting entitlement to prior user rights to meet the exact same threshold of U.S. manufacturing as the working requirement. Another possibility is to exclude importation from the scope of the prior user rights. Either would prevent firms from abusing their prior user rights to import inventions.

H. Patent Trolls for the Progress of American Science and Useful Arts

The working requirement with all of the additional features discussed above is likely enough to encourage firms to manufacture their patented inventions in the United States.¹³¹ But even with the decline of the United States as the dominant economic power and with a concomitant reduction of the disparity in manufacturing

130. 35 U.S.C. § 273 (2012).

131. It seems unlikely that reasonably run firms would risk their crown jewels in the U.S. market by refusing to comply with the working requirement. For instance, under the current proposal, an enterprising firm could take a compulsory license to not only manufacture products embodying the patented technologies of Apple's iPhone and iPad in the United States, should Apple fail to meet the threshold of U.S. manufacturing with regard to those products, but also enjoin Apple from importing those products. While this firm would need to avoid trademark and trade dress infringement, it could use its compulsory license to essentially take over Apple's iPhone and iPad sales in the United States. While the U.S. market is certain to decline in importance compared to other markets, it will likely still be of sufficient size to ensure that firms will not lightly surrender to some other firm the U.S. profits for inventions that have already been created and proven marketable in the United States.

costs with other countries, many firms with the capability and know-how to manufacture patented inventions will still likely find it more profitable to manufacture outside of the United States. These firms would therefore have an incentive to collude in refusing to apply for compulsory licenses on each other's patents so as to avoid being forced to manufacture in the United States. Furthermore, such collusion would be extremely difficult to reach through antitrust law, especially if all the firms act silently in concert. As the Court stated in *Bell Atlantic Corp. v. Twombly*, "Without more, parallel conduct does not suggest conspiracy, and a conclusory allegation of agreement at some unidentified point does not supply facts adequate to show [antitrust] illegality."¹³² The difficulty of any plaintiff in finding out the "more" required to even plead a conspiracy is such that antitrust law will likely be no deterrent to silent collusion. The benefits of the working requirement will be unrealized if many firms collude to not apply for compulsory licenses.

This is where patent trolls can be employed for a useful social purpose. Patent trolls who do not manufacture their inventions by definition cannot satisfy the working requirement. Therefore, they would no longer be able to threaten firms that manufacture infringing products in the United States, since these firms merely need apply for compulsory licenses if the patent trolls bother them at the negotiating table or at court.

However, the current proposal for the working requirement does not alter the ability of patent trolls to assert their patent rights, through Section 337 actions in the ITC,¹³³ against firms that import infringing products and that cannot apply for compulsory licenses unless they satisfactorily prove that they can manufacture the invention in the United States in an effective and serious manner.

Patent trolls can therefore be exploited to drive firms to manufacture in the United States. After all, firms that import the infringing products are unlikely to be in collusion with patent trolls, which view such firms as prey. And because patent trolls can obtain from the ITC orders to have imported infringing products "excluded from entry into the United States,"¹³⁴ firms that would

132. *Bell Atlantic Corp. v. Twombly*, 550 U.S. 544, 556–57 (2007).

133. 19 U.S.C. § 1337(a)(1)(B).

134. *Id.* § 1337(d).

like to continue to sell their products in the United States will have to resort to compulsory licenses through a showing to the decision-making authority that the patent trolls failed the working requirement and that they themselves will begin manufacturing the infringing product in the United States. Moreover, these firms will have no choice but to shift some of their manufacturing to the United States because the patent trolls have the right to enjoin them from importing altogether if they fail to meet the threshold of U.S. manufacturing after obtaining their compulsory licenses. Patent trolls therefore possess immense power through the threat of exclusionary orders to force importing firms that would otherwise collude to either manufacture technology in the United States or at least create a gap for firms that have the capacity to manufacture in the United States to exploit their abilities to take a compulsory license and corner the market.¹³⁵

The importing infringers, however, may still be able to find some way to settle or collude with patent trolls so as to avoid manufacturing in the United States. Certainly, in a case in which a patent troll holds a patent over an invention that only one firm would want to manufacture, the patent troll and the firm could agree to a licensing fee high enough that the patent troll would not invoke its entitlement to exclusion but low enough that the firm would not seek a compulsory license and manufacture in the United States.

This scenario should not be too concerning because the result as to where the patented invention is ultimately manufactured would be no different if the firm held the patent itself. After all, if

135. Under current law, patent trolls have the ability to obtain import orders against infringing imports from the ITC in Section 337 actions but are confined to reasonable royalties from the federal courts in infringement suits due to the combination of *eBay* and *Panduit*; *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006); *Panduit Corp. v. Stahl Bros. Fibre Works*, 575 F.2d 1152 (6th Cir. 1978). Therefore, it may be tempting to argue that firms are already incentivized to manufacture within the United States by the patent trolls. But it is very difficult to imagine any reasonably run firm making the business decision, in response to a loss at the ITC to a patent troll, to (A) shift its production of the infringing product to the United States and (B) rely on its ability to convince a district court that, even though it had manifested every and all intention to continue infringing the patent, the patent troll is still entitled to no remedy more stringent than a reasonable royalty simply because manufacture of the infringing product is now taking place in the United States. A working requirement explicitly allowing firms to avoid patent trolls by manufacturing in the United States is therefore necessary.

there were only one firm in the world desirous and capable of manufacturing the invention, there would be no second firm that could meet the qualifications to apply for the compulsory license should the first firm fail to manufacture in the United States. The working requirement is simply not designed to force the manufacture in the United States of a patented invention that only one firm can and will manufacture.¹³⁶

But in the more common case in which multiple parties hope to import products embodying an invention patented by a troll, the possibility of collusion is troubling. However, a simple analysis of the economics suggests that the decision-making authority, in engineering the licensing fees for compulsory licenses, can incentivize firms to abandon collusion with a patent troll and seek compulsory licenses for manufacturing in the United States¹³⁷ such that the patent troll is compelled to find a compulsory licensee who will manufacture in the United States. That does not mean, however, that the decision-making authority should always compel manufacturing of a patented invention in the United States. Relatively simple mathematical threshold criteria can be defined to take into account such factors as the demand of the patented invention and the difference in the efficiency in manufacturing in the United States and overseas, so that a reasonable compulsory licensing fee can be set.¹³⁸

V. CONCLUSION

This Article examined the rationale of and the practicalities of introducing a new working requirement into U.S. patent law that would incentivize the manufacture of inventions in the United States. It pointed to the deficiencies of the current dominant theoretical justifications of the U.S. patent system in light of global dynamics and trends of modern information technology and suggested a return to a conception of the patent law as a nationalistic means to promote the Progress of American Science and useful Arts. A new patent working requirement would be well calibrated to help the U.S. patent system fulfill this constitutional

136. It is highly unlikely that such an invention is of much industrial importance at any rate.

137. See *infra* Appendix 1.

138. See *infra* Appendix 2.

mandate by giving Americans opportunities for meaningful exposure to and mastery of advanced science and technology. The Article outlined several features that ought to be incorporated into the new working requirement so as to prevent gaming of the working requirement without unduly sacrificing efficiency.

That the United States will, in the near and medium term, continue to lose its lead as the foremost power in the world is certain. But with smart policies and decisive leadership that focus on internal development and growth, this decline can be reversed or curbed. And with its resources and geographic advantages, the United States can remain competitive even if the manpower and market size of its competitors come to dwarf its own.

A strong United States that keeps punching above its weight in technology and innovation is a goal with broad, popular support. President Obama has argued that, for the nation to “win the future,” it will need to “outinnovat[e], outeducat[e], and outbuild[] our competitors.”¹³⁹ President Trump similarly stated that “America will start winning again, winning like never before” and vowed that the United States will “unlock the mysteries of space, to free the Earth from the miseries of disease, and to harness the energies, industries, and technologies of tomorrow.”¹⁴⁰ It is time for the United States to put a working requirement into patent law and employ patent law to “win.”

139. Barack H. Obama, President of the United States, The President’s Weekly Address, January 29, 2011, 2011 PUB. PAPERS 68, 68–69 (Jan. 29, 2011), <https://www.gpo.gov/fdsys/pkg/PPP-2011-book1/pdf/PPP-2011-book1-doc-pg68.pdf>.

140. Trump, Inaugural Address, *supra* note 99.

APPENDIX 1

The demand of the market for the patented invention can be taken to have the inverse demand form:

$$D = G - X$$

where X is the total output. The cost for all the firms manufacturing the invention can also simplistically be assumed to be the sum total of a component linearly proportional to the units produced and a lump sum S to be paid to the patent troll:

$$C = (B + L + A)x + S$$

where B is the cost of manufacturing each unit overseas, L is the per unit fee paid to the patent troll, and A is the difference between the cost of manufacturing each unit in the United States and overseas respectively.

Three situations can be considered: (A) a Cournot duopoly situation where all parties have agreed that the two firms should collude to manufacture overseas and where L takes the value of L_2 ; (B) a monopoly situation where a firm is granted an exclusive license to manufacture in the United States and where L takes the value of L_3 ; and (C) a compulsory licensing situation where L takes the value of L_1 . The labels of L are purposefully chosen so that:

$$L_1 < L_2 < L_3.$$

(A) For the collusive duopoly situation, the first firm's profit is the revenue minus the cost:

$$P_1 = R_1 - C_1 = (G - x_1 - x_2)x_1 - ((B + L_2)x_1 + S_1)$$

Maximization of this profit yields:

$$\frac{\partial}{\partial x_1} P_1 = 0 \rightarrow x_2 + 2x_1 = G - (B + L_2)$$

The symmetrical circumstances of the first and second firm mean that the second firm will produce the same number of units as the first firm:

$$x_2 = x_1$$

Simplification of the previous expression yields:

$$x_1 = \frac{1}{3}(G - (B + L_2))$$

The patent troll's profit is therefore:

$$P_{troll} = L_2X + S_1 + S_2 = L_2(2x_1) + 2S_1 = \frac{2}{3}L_2(G - (B + L_2)) + 2S_1$$

If the patent troll manages to extort all of the profits from the firms, the patent troll earns:

$$\begin{aligned} P_{troll,max} &= \frac{2}{3}L_2(G - (B + L_2)) + 2((G - 2x_1)x_1 - (B + L_2)x_1) \\ &= \frac{2}{9}(G - (B + L_2))(G - B + 2L_2) \end{aligned}$$

The patent troll could maximize profits further by engineering the per unit licensing fees, and the patent troll's maximum profit could be solved as:

$$\frac{\partial}{\partial L_2} P_{troll,max} = 0 \rightarrow L_2 = \frac{1}{4}(G - B) \rightarrow P_{troll,max} = \frac{1}{4}(G - B)^2$$

(B) For the monopoly situation, in which the patent troll grants an exclusive license to one of the firms to manufacture the invention in the United States, the exclusive licensee operates as though a monopolist. The exclusive licensee's marginal cost is:

$$\frac{\partial}{\partial x} C = \frac{\partial}{\partial x} ((B + L_3 + A)x + S) = B + L_3 + A$$

and the exclusive licensee's marginal revenue is:

$$\frac{\partial}{\partial x} R = \frac{\partial}{\partial x} (x(G - x)) = G - 2x$$

The total number of units produced is solved by equating the two, such that:

$$x = \frac{1}{2}(G - (B + L_3 + A))$$

The exclusive licensee's profit would therefore be:

$$\begin{aligned} P &= R - C = x(G - x) - (B + L_3 + A)x - S \\ &= \frac{1}{4}(G - (B + L_3 + A))^2 - S \end{aligned}$$

The patent troll's profit in this case is:

$$P_{troll} = L_3 X + S = L_3 x + S = \frac{1}{2}L_3(G - (B + L_3 + A)) + S$$

Under the assumption that the patent troll manages to extort the licensee to surrender all profit, the troll's profit is:

$$\begin{aligned} P_{troll,max} &= \frac{1}{2}L_3(G - (B + L_3 + A)) + \frac{1}{4}(G - (B + L_3 + A))^2 \\ &= \frac{1}{4}(G - (B + L_3 + A))(G - (B + A) + L_3) \end{aligned}$$

The patent troll will again maximize profit with regard to the per unit fees, such that:

$$\frac{\partial}{\partial L_3} P_{troll,max} = 0 \rightarrow L_3 = 0 \rightarrow P_{troll,max} = \frac{1}{4}(G - (B + A))^2$$

Since it is rarely cheaper to manufacture in the United States than overseas, such that:

$$B + A > B$$

the maximum profit for the patent troll in the monopolist case, $\frac{1}{4}(G - (B + A))^2$, is almost certain to be lower than the maximum profit for the patent troll in the duopolist case, $\frac{1}{4}(G - B)^2$. In other words, the maximum profit the patent troll would earn by granting an exclusive license for the manufacture of the invention in the United States will almost always be lower than what the patent troll could earn by colluding with the duopolists.

It is now possible to relax, for the collusive duopoly situation, the assumption that the patent troll was able to demand all of the profits from the colluding duopolists. Because of the existence of the working requirement, the duopolists could threaten to go to the decision-making authority to obtain compulsory licenses when bargaining with the patent troll if the patent troll unreasonably demanded all of their profits. However, the patent troll could still point to the licensing fee obtainable in an exclusive licensing situation as the minimum acceptable amount from the duopolists because the patent troll could obtain that much in profit by granting an exclusive license to one of the duopolists. Under the assumption that the patent troll secures its baseline in the bargain, each of the firms would then be able to maximize its own profits:

$$P_1 = (G - x_1 - x_2)x_1 - (B + L_2)x_1 - S_1 = \frac{1}{9}(G - (B + L_2))^2 - S_1$$

by structuring the licensing fees and lump sum payments such that:

$$\begin{aligned} P_{troll} &= \frac{(G - (B + A))^2}{4} \rightarrow S_1 \\ &= \frac{(G - (B + A))^2}{8} - \frac{1}{3}L_2(G - (B + L_2)) \end{aligned}$$

Solving for the profits each of the duopolists would earn by maximizing the profits with relation to the licensing fee yields:

$$\begin{aligned} P_1 &= \frac{1}{9}(G - (B + L_2))^2 - \frac{1}{8}(G - (B + A))^2 + \frac{1}{3}L_2(G - (B + L_2)) \\ &\rightarrow \frac{\partial}{\partial L_2} P_1 = 0 \rightarrow L_2 = \frac{1}{4}(G - B) \end{aligned}$$

Therefore, the profit for each colluding duopolist is:

$$P_1 = \frac{1}{8} \left((G - B)^2 - (G - (B + A))^2 \right)$$

(C) The case in which one of the duopolists betrays the collusion and applies for a compulsory license can now be considered. It can be supposed that the other duopolist will respond by applying for the compulsory license as well. The calculation is similar to the case of the collusive duopoly, and the number of units produced by each firm is similar to that from before:

$$x_1 = \frac{1}{3} (G - (B + L_1 + A))$$

However, because it would be unfair for the decision-making authority to grant a lump sum payment to the patent troll, it will grant a compulsory licensing fee proportional to the units produced by each firm. The patent troll will not be able to maximize profit as in the earlier case by manipulating the licensing fees and the lump sum payments from the firm. As such, the patent troll's profit is:

$$P_{troll} = L_1 X = L_1 (2x_1) = \frac{2}{3} L_1 (G - (B + L_1 + A))$$

and the profit for each firm is:

$$P_1 = \frac{1}{9} (G - (B + L_1 + A))^2$$

The decision-making authority can incentivize the duopolists to betray any collusive duopoly by ensuring that the profit for each duopolist in collusion is lower than the profit for each duopolist after betrayal by manipulating the licensing fee:

$$\frac{1}{8} \left((G - B)^2 - (G - (B + A))^2 \right) < \frac{1}{9} (G - (B + L_1 + A))^2$$

such that:

$$L_1 < (G - (B + A)) - \sqrt{\frac{9}{8} \left((G - B)^2 - (G - (B + A))^2 \right)}$$

And in turn, knowing that collusive deals are not tenable, the patent troll would grant an exclusive license to manufacture in the United States to one of the firms that wanted to participate in the market.

APPENDIX 2

This appendix expands on the previous analysis to determine ways to set reasonable compulsory licensing fees that take into account factors such as the demand of the patented invention and the difference in the efficiency in manufacturing in the United States and overseas.

The following parametrization can be applied:

$$G - (B + A) = \alpha(G - B)$$

where α is a positive quantity less than 1. The compulsory licensing fees condition that we have obtained in the previous expressions can be rewritten as:

$$\begin{aligned} L_1 &< \alpha(G - B) - \sqrt{\frac{9}{8}((G - B)^2 - \alpha^2(G - B)^2)} \\ &= (G - B) \left(\alpha - \sqrt{\frac{9}{8}(1 - \alpha^2)} \right) \end{aligned}$$

It can readily be observed that the compulsory licensing fees would be 0 if:

$$\alpha - \sqrt{\frac{9}{8}(1 - \alpha^2)} = 0$$

A compulsory licensing fee of 0 would clearly be unfair, so a minimum condition for the licensing fee can be defined where:

$$\alpha - \sqrt{\frac{9}{8}(1 - \alpha^2)} > 0 \rightarrow \alpha > \sqrt{\frac{9}{17}} \cong 0.728$$

By choosing an appropriate α , the licensing fee can be calculated. Through the parameters G , B , and A in the expression for α , the calculation respectively takes into account the demand, the costs of

manufacturing overseas, and the costs of manufacturing in the United States.