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## Protecting the Boundaries: Unclaimed Consideration in the Patentee's Social Contract

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*This Article argues that the primary value society receives in the patentee's social contract is not new inventions, but "unclaimed consideration." Unclaimed consideration takes many forms: additional innovations to improve on the patented invention, additional innovations created through efforts to design around the patented invention, innovations created by losers in the patent race, innovations informed by the unclaimed technical information in patents, commercialization of the patented invention or these other innovations, and the signals that patents give to investors regarding the value of a company or research lab. While there are many schools of patent scholarship engaged in spirited debate regarding how patents serve (or fail to serve) society, this Article is the first to recognize and map the growing consensus among modern patent theories that unclaimed consideration is of significant value and importance to society. Indeed the majority of claimed inventions are never commercialized, and so granting the patent monopoly in most cases can only be justified by society receiving some other form of consideration. Courts should therefore guard the boundaries of patent claims to avoid the perverse result of allowing the thicket of claimed inventions to stifle the development of unclaimed consideration. This Article demonstrates this point through a case study of Siemens Medical Solutions v. Saint-Gobain Ceramics & Plastics, in which the United States Court of Appeals for the Federal Circuit decided that a product can infringe on a patent even after it is declared by the United States Patent and Trademark Office (USPTO) to be separately patentable and non-obvious over the asserted patent.<sup>1</sup> The majority of a sharply divided court thereby allowed a broad doctrine of equivalents to ensnare unclaimed consideration, relying on reasoning myopically wed to the belief that the sole way in which the patent laws promote scientific progress is by incentivizing claimed inventions.<sup>2</sup> Courts instead should protect unclaimed consideration, which modern patent theory recognizes is the substantial return society ought to receive in return for the patent grant.*

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1. See *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269 (Fed. Cir. 2011).

2. *Id.*

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## I. INTRODUCTION

“You can patent that?” That is what an engineer once asked me during deposition prep when I showed him the asserted patent. And this was not the first time. Showing patents to high-tech innovators often elicits a variation of the following question: How can you patent something that is so very obvious, inefficient, or has been independently and simultaneously developed in some variation and used throughout the industry?

Indeed, the value of most claimed inventions to society is dubious. Less than half of all patents are ever commercialized and only about 5%

of patents are ever licensed for a royalty.<sup>3</sup> This means that most claimed inventions serve no immediately perceivable direct benefit to society in the form of a useable product.<sup>4</sup> To the contrary, in some technology areas, patents may harm innovation.<sup>5</sup> Many scholars have complained of “a patent thicket” in particular industries, a large number of low quality patents that serve no other purpose than to create mazes through which innovators must navigate in order to bring a product to market.<sup>6</sup> As Christopher Cotropia has argued, “these early-filed and undeveloped patents do little more than generate costs to other developers.”<sup>7</sup> At best they stand as roadblocks to be navigated by innovators. At worst they become licensing and litigation tools that directly tax innovation.<sup>8</sup>

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3. Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 362-64 (2010).

4. *Id.* at 355 (“[A]bsent consumable, commercial products incorporating this information, patent law would provide little benefit to the public.”).

5. Throughout this Article, I shall be referring to the distinction between *inventions* and *innovations*. This distinction was excellently articulated by Robert P. Merges:

An *invention* refers to the practical implementation of the inventor’s idea. This often takes the form of a prototype or model. An invention, then, is more than a concept (it is usually a tangible thing), but less than the fully worked out product or process first offered for sale to customers. An *innovation* is the “debugged” and functional version of the invention: the version first offered for sale.

Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CALIF. L. REV. 803, 807 (1988).

6. See, e.g., Amber Rose Stiles, *Hacking Through the Thicket: A Proposed Patent Pooling Solution to the Nanotechnology “Building Block” Patent Thicket Problem*, 4 DREXEL L. REV. 555, 562 (2012) (“The dense tangle of existing IP rights prevents downstream entities from producing innovative technology because they cannot afford to license the litany of ‘building block’ patents necessary to provide protection from infringement litigation.”); Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools and Standard-Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119-26 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2001) (“[As patent thicket is a] web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology.”); Stu Woolman et al., *Evidence of Patent Thickets in Complex Biopharmaceutical Technologies*, 53 IDEA 1, 3 (2013) (“First, one initially observes a thicket effect when a downstream commercial seller must acquire a license from two or more patent owners. Second, the thicket effect becomes quite pronounced when there are three or more patent owners. Third, where four or more patent owners exist, the thicket effect is so strong that a potential seller will find it virtually impossible to negotiate successfully all of the licenses necessary to create a downstream commercially viable product.”); Amit Makker, *The Nanotechnology Patent Thicket and the Path to Commercialization*, 84 S. CAL. L. REV. 1163, 1175-76 (2011) (“Generally, a patent thicket will require an innovator to seek out and negotiate licenses with many patent holders in the field of endeavor to ensure that the innovator will not be sued for patent infringement when building upon the work of others. Not only could the licenses themselves be costly, the transaction costs associated with seeking out these patent holders could also be large.”).

7. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 112 (2009).

8. See *id.* (“Uncommercialized patents also fuel the use of patents as a litigation tool.”).

This patent thicket would impose less of a tax on innovation if patent holders themselves were bringing products to market; however, the majority of patent litigation is brought by nonpracticing entities—“patent trolls” who acquire patents not in order to put products on the market, but to obtain licensing fees (through litigation if necessary) from companies that do endeavor to develop, manufacture, and sell new products.<sup>9</sup> One study reported that patent trolls imposed direct litigation costs of \$29 billion on defendants in 2011 alone.<sup>10</sup> This figure does not even include the substantial royalties paid to patent trolls in licensing negotiations to avoid the cost of litigation.<sup>11</sup> In this context, claimed inventions serve as a tax on innovation, impeding or even preventing the efficient commercialization of new products for the public.

If the foregoing account is to be credited,<sup>12</sup> it raises the question as to whether society is receiving sufficient valuable consideration in exchange for the patent monopoly. The Constitution of the United States gives the United States Congress the authority to grant patents in order to achieve a stated societal good. Society incurs the cost to competition of ceding limited monopolies to individuals in order “[t]o promote the Progress of Science and useful Arts.”<sup>13</sup> The Supreme Court of the United States has employed the metaphor of a contract to describe this relationship between society and the patent holder: the government grants the exclusionary right in exchange for “the quid pro quo of substantial creative effort.”<sup>14</sup>

Under the traditional “reward theory” of patent protection, the consideration that society receives in exchange for the patent grant is the

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9. Robin Feldman, Thomas Ewing & Sara Jeruss, *The AIA 500 Expanded: The Effects of Patent Monetization Entities*, 17 UCLA J. L. & TECH. 1, 16 (2013) (estimating that nonpracticing entities filed 58.7% of the patent infringement lawsuits in 2012).

10. James E. Bessen & Michael J. Meurer, *The Direct Costs from NPE Disputes*, 99 CORNELL L. REV. 387, 408 (2014).

11. *Id.* at 409.

12. And it need not be. See, e.g., James F. McDonough, *The Myth of the Patent Troll: An Alternative View of the Function of Patent Dealers in an Idea Economy*, 56 EMORY L.J. 189, 216-23 (2006) (arguing that the evolution of an efficient market for inventions gives inventors an incentive to invent and gives the public “easier and broader access to inventions”); see also Ryan T. Holte, *Trolls or Great Inventors: Case Studies of Patent Assertion Entities*, 59 ST. LOUIS U. L.J. 1, 11-12 (2015) (summarizing the scholarship concluding that “individual inventors are being encouraged to invent through economic return from patent licensing allowed by [patent assertion entities]”).

13. U.S. CONST. art. I, § 8, cl. 8.

14. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 161 (1989). But see Shubha Ghosh, *Patents and the Regulatory State: Rethinking the Patent Bargain Metaphor After Eldred*, 19 BERKELEY TECH. L.J. 1315, 1349 (2004) (“The metaphor of the patent bargain rests on a naive view of social contract theory, based on questionable assumptions about private orderings, that reduces patent law to a tool for protecting property rights.”).

inventions claimed in patents.<sup>15</sup> This traditional view maintains that the sole purpose and function of the patent system is to induce inventors to make claimed inventions by rewarding them with a temporary monopoly. Mark F. Grady and Jay I. Alexander have described the theory as follows: “Although English classical economists like Adam Smith accepted the traditional view that monopoly was ‘necessarily hurtful’ to society, they nonetheless thought a temporary monopoly granted to an inventor was a good way to reward the inventor’s risk and expense.”<sup>16</sup> In modern times, the reward theory has been repeated and extended. John Bates Clark justified the patent system by stressing the relatively free appropriability of new ideas.<sup>17</sup> In the absence of a publicly enforced property right, he argued, there would be too little invention.<sup>18</sup> In essence, the reward theory maintains that when the Constitution seeks “[t]o promote the Progress of Science and the useful Arts” by giving Congress the power to issue patents, the sole measure of that “progress” is the receipt by society of patented inventions.<sup>19</sup>

But if the claimed inventions that society receives in this contract either never see the light of day because they remain uncommercialized or stand in the way of innovation by creating a patent thicket, it calls into question the utility of the patent system.

Perhaps the “progress” gained by granting and publishing a patent is not the particular invention that is claimed in the patent. Perhaps the more valuable forms of consideration are the further inventions, innovations, market entries, and scientific knowledge that are indirectly caused by the existence of patents. This second category of consideration that society receives for a patent we will call “unclaimed consideration.” It is informed by the technical teaching of patents, or inspired by attempts to design around, improve, combine, and build on

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15. See CRAIG ALLEN NARD, *THE LAW OF PATENTS* 31 (2d ed. 2011) (“The historically predominant theory is the *incentive to invent*, which focuses on efficiency gains and the internalization of externalities.”).

16. Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305, 310 (1992) (citing ADAM SMITH, *THE WEALTH OF NATIONS* 189, 339 (James E. Thorold Rogers, ed., Oxford, The Clarendon Press 2d ed. 1880) (1776)).

17. *Id.*

18. *Id.* at 311 (citing JOHN B. CLARK, *ESSENTIALS OF ECONOMIC THEORY* 358-72 (photo. reprint 1968) (1927)); see also NARD, *supra* note 15, at 31 (“This theory seeks to address the effects of Arrow’s Information Paradox, and holds that—due to the public goods nature of information—without the prospect of a property right, inventors would be unable to recoup (internalize) their research and development costs because third parties could simply copy the invention and compete with the inventor unencumbered by the need to recover fixed costs.”).

19. U.S. CONST. art. I, § 8, cl. 8; see Merges, *supra* note 5, at 805-12 (arguing that the courts improperly take into account commercial success in the obviousness determination, because the patent system should directly award inventions, not innovations).

patented inventions and technical information disclosed in patents.<sup>20</sup> It can also be the indirect result of a patent race or the investment inspired by the signals a patent portfolio gives potential investors in a company.

There is broad disagreement among the various schools of modern patent scholarship regarding how the patent law should foster innovation. Should the law grant broad upstream rights or narrow downstream rights? Should patent exclusivity or free competition best drive innovation?<sup>21</sup> One scholar has described the state of patent scholarship as a “stalemate of empirical intuitions.”<sup>22</sup> However, if one reads into the various schools of thought carefully, there appears to be growing consensus on one issue. Whatever value society receives in exchange for a patent grant, it is substantially (if not primarily) something other than the claimed inventions themselves; it is unclaimed consideration. Unclaimed consideration is not necessarily a positive externality, or “spillover,”<sup>23</sup> because the inventor herself may well capture the value of this unclaimed consideration (for example, by developing the invention into an innovation or using the patent signals to communicate information about her company). It is, rather, any of the benefits received by society as consideration in exchange for the patent grant that is beyond the value of the claimed inventions themselves.

Part II of this Article reviews the various schools of modern patent scholarship to show how they all value unclaimed consideration.

#### A. *Disclosure Theory*

Disclosure theory recognizes the value of the technical teachings contained in patents, including those teachings that are not claimed as inventions.<sup>24</sup> Recent research demonstrates that technical information contained in patents is more valuable to researchers than once believed. In a survey of nanotechnologists by Lisa Larrimore Ouellette, the majority (64%) of respondents stated that they had consulted patents for research purposes.<sup>25</sup> Contrary to popular belief, researchers largely do not avoid

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20. See Anna B. Laakmann, *An Explicit Policy Lever for Patent Scope*, 19 MICH. TELECOMM. & TECH. L. REV. 43, 44 (2012).

21. *Id.*

22. *Id.* (quoting ADRIAN VERMEULE, *JUDGING UNDER UNCERTAINTY: AN INSTITUTIONAL THEORY OF LEGAL INTERPRETATION* 153 (2006)).

23. See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257 (2007) (disputing the law and economics view to argue that positive externalities created by patents can enhance public welfare).

24. Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 541 (2009).

25. Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HARV. J.L. & TECH. 545, 571 (2012).

reading patents for fear of willful infringement liability.<sup>26</sup> Most critically, it is not necessarily the claimed inventions that researchers find useful in reading patents; in fact, researchers complain that the inventions themselves cannot be reproduced by reading the patent document.<sup>27</sup> Rather, a majority of researchers find useful information in patents related to background technology, technical details, and other nonclaimed information.<sup>28</sup> This makes sense. Presumably if one wanted to conduct research related to semiconductor fabrication, for example, or perhaps even enter that market, the nonproprietary teachings contained in the patent portfolios of Intel, Qualcomm, and Samsung would provide valuable information regarding equipment, and processes used in the industry. Accordingly, disclosure theory recognizes that in exchange for the patent grant, society receives patent disclosures that contribute to innovations and market entries unrelated to the claimed inventions.<sup>29</sup>

### B. Commercialization Theory

Commercialization theorists maintain that the patent system should encourage the full commercialization and marketing of products, and not just new inventions.<sup>30</sup> A tremendous amount of work and investment must occur in order to turn a patented invention into a commercial product that will directly benefit the public, including the development and testing of working prototypes, product modifications and improvements, market research and marketing, distribution, and so forth.<sup>31</sup> These activities and investments are ideally a substantial part of the consideration society receives in exchange for the patent, because “absent consumable, commercial products incorporating this information, patent law would provide little benefit to the public.”<sup>32</sup> Accordingly, despite commercialization theorists’ quarrels with the disclosure theory, both theories recognize the value of unclaimed consideration.

The problem is that the majority of claimed inventions are not commercialized, and rather often pose a barrier to the creation of commercialized products—the very consideration that commercializa-

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26. *Id.* at 579-81.

27. Ouellette, *supra* note 25, at 577-79.

28. *Id.* at 575-76.

29. *See infra* Part II.B.

30. Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 711 (2012) (“Commercialization theory . . . hypothesizes that we grant patents in order to encourage not invention but product development.”).

31. *See, e.g.*, Cotropia, *supra* note 7, at 88-93; Sichelman, *supra* note 3, at 347-54.

32. Sichelman, *supra* note 3, at 354.

tion theorists believe society should receive in return for the patent monopoly. In order to directly encourage product development, commercialization theorists propose various radical reforms to the patent system, such as the creation of “innovation warrants” and “commercialization patents.”<sup>33</sup> In light of the fact that such major reforms are unlikely, and given the growing consensus in support of the value of unclaimed consideration, this Article begins the task of identifying modest, judge-made reforms that would encourage and protect unclaimed consideration from the thicket of claimed inventions.<sup>34</sup>

### C. Prospect Theory

Prospect theorists maintain that broad, early patent rights should be granted to inventors so that they might develop them as a miner develops a prospect.<sup>35</sup> This discourages or cuts short innovation races, which prospect theorists argue are wasteful because they result in the simultaneous, duplicative investigation of the same problems by multiple investigators.<sup>36</sup> The pioneer of prospect theory, Edmund W. Kitch, has argued that early, broad patent rights put “the patent owner in a position to coordinate the search for technological and market enhancement of the patent’s value so that duplicative investments are not made, and so that information is exchanged among the searchers.”<sup>37</sup>

The premises and prescriptions of prospect theory are subject to piercing criticism. As discussed below, innovation races are productive, not wasteful; first claimants are not necessarily the best equipped to coordinate the development of inventions into practical innovations, and the early granting of patent rights results in inefficiencies, increased litigation, and the underdevelopment of patented inventions.<sup>38</sup>

The primary purpose of this Article, however, is not to point out the flaws of prospect theory or any of the other theories being discussed. Rather, this Article argues that prospect theory agrees with the other theories discussed in this Article on one critical point: a primary

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33. See *infra* Part II.C.

34. See *infra* Part II.C.

35. See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 276 (1977) (“[A] patent ‘prospect’ increases the efficiency with which investment in innovation can be managed.”).

36. *Id.* Less traditional prospect theorists are more receptive to patent races. See, e.g., John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 444-45 (2004) (arguing that patent races cause inventors to work faster, which results in earlier patents that expire and are thereby dedicated to the public earlier).

37. Kitch, *supra* note 35, at 276.

38. See *infra* Part II.D.



consideration society receives in exchange for the patent grant is unclaimed consideration, not claimed inventions. In particular, prospect theorists advance their prescriptions in order to achieve the development of inventions into *innovations* for commercial or public use.<sup>39</sup> Hence, prospect theory too recognizes that in exchange for the patent grant, society should receive something beyond the inventions claimed in a patent.<sup>40</sup>

#### D. Patent Race Theory

Patent race theory directly refutes prospect theory's hostility towards innovation races by pointing out that the majority of inventions are discovered, and innovations developed, only as the result of multiple, competing researchers working simultaneously on the same problem.<sup>41</sup> Accordingly, many famous inventions would not exist absent an innovation race to spur them on. Critical to this Article, however, is patent race theory's recognition of the value of unclaimed consideration. Researchers engaged in a patent race who fail to obtain the patent often discover a different, beneficial invention in the process.<sup>42</sup> Patent races push researchers to work faster, resulting in the earlier entry of patented inventions into the public domain and the earlier development of cumulative improvements from others.<sup>43</sup> Further, the pressure of a perceived patent deadline may cause researchers to do better work.<sup>44</sup> Accordingly, although patent race theory quarrels with disclosure theory, commercialization theory, and prospect theory in other respects,<sup>45</sup> it also recognizes the value of unclaimed consideration as a primary benefit of the patent grant.<sup>46</sup>

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39. See, e.g., Yoram Barzel, *Optimal Timing of Innovations*, 50 REV. ECON. & STAT. 348, 349 (1968) ("The model is set to determine the date for which an innovation is socially optimal, the date for which it maximizes profit for its owner."); Kitch, *supra* note 35, at 266 (arguing that the prospecting nature of the patent system stimulates technological innovation which "can be undertaken efficiently only if there is a system that tends to assure efficient allocation of the resources among the prospects at an efficient rate and in an efficient amount").

40. See *infra* Part II.D.

41. See Lemley, *supra* note 30, at 712-33.

42. JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 400 (1988) ("[T]he loser of a patent race does not always lose everything; sometimes it comes up with a patent for another product. . . . It would thus be desirable to formalize successive patent races."); see also Cotropia, *supra* note 7, at 86 (citing Giovanni De Fraja, *Strategic Spillovers in Patent Races*, 11 INT'L J. INDUS. ORG. 139, 140 (1993); Jennifer F. Reinganum, *A Dynamic Game of R and D: Patent Protection and Competitive Behavior*, 50 ECONOMETRICA 671, 671 (1982)).

43. Lemley, *supra* note 30, at 753.

44. *Id.*

45. *Id.* at 738-49.

46. See *infra* Part II.E.

*E. Signaling (or Portfolio) Theory*

The portfolio theory of patent protection recognizes that a company's patent portfolio can be used to signal information to investors about the company.<sup>47</sup> In such instances, it is not only (and perhaps not even) the value of claimed inventions in the portfolio that are critical. Rather, it is what the patents demonstrate about the company's technical expertise and the resources the company invests into research and development.<sup>48</sup> Accordingly, patents serve primarily as conveyors of information to facilitate efficient investment, innovation, and growth—unclaimed effects unrelated to the claimed inventions.<sup>49</sup>

Accordingly, the various modern schools of patent scholarship increasingly agree that unclaimed consideration is a substantial value that society receives in exchange for the patent grant. It may equal or exceed the benefit of the patented inventions themselves. Part III of this Article begins by arguing that we should recognize this growing consensus view and focus patent reform on fostering and protecting unclaimed consideration from the encroachment of patent claims. However, we need not do this by proposing radical modifications to the patent law that are unlikely to be enacted and could disturb the innovation ecosystem in unforeseen ways. Rather, protecting unclaimed consideration can be achieved by modest, incremental judicial reform. When deciding close issues, or resolving issues of first impression, judges should lean on the side of protecting and promoting unclaimed consideration, rather than strengthening the reach of patent rights under the belief that the sole purpose of the patent system is to incentivize claimed inventions.<sup>50</sup>

The Article then illustrates this point with a detailed case study of a Federal Circuit decision, *Siemens Medical Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*<sup>51</sup> In *Siemens*, the court found infringement under the doctrine of equivalents by a product that was separately patented as a nonobvious variation of the patent-in-suit.<sup>52</sup> Part III examines the patents at issue and the accused product, an improved scintillator for medical imaging that was a tremendous commercial

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47. See Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 646 (2002).

48. *Id.*

49. See *infra* Part II.F.

50. See *infra* Part III.A.

51. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269 (Fed. Cir. 2011), *reh'g en banc denied*, 647 F.3d 1373 (Fed. Cir. 2011), *cert. denied*, 132 S. Ct. 2679 (May 29, 2012); see Holte, *supra* note 12, at 19-20 (“Case studies are an important part of empirical research used to illustrate or disprove theories proposed in other analyses.”).

52. *Siemens*, 637 F.3d at 1283-84.

success.<sup>53</sup> The accused scintillator was precisely the type of unclaimed consideration that society deserves to receive in exchange for the patent grant. Yet, a divided panel of the Federal Circuit affirmed infringement under the doctrine of equivalents and subsequently denied rehearing en banc over vigorous dissents.<sup>54</sup> The doctrine of equivalents must not be used to ensnare nonobvious variations of claimed inventions because such follow-on innovations are the very types of unclaimed consideration the patent laws should foster and protect. The Article concludes by arguing that the doctrine of equivalents is a particular threat to unclaimed consideration to the extent it allows patents to ensnare anything more than trivial modifications of the claimed inventions, as happened in *Siemens*, and that the phenomenon of blocking patents does nothing to assuage these concerns.<sup>55</sup>

## II. THE VALUE OF UNCLAIMED CONSIDERATION

### A. *Unclaimed Consideration in the Law*

Academic theory aside, the law has long recognized the value of unclaimed consideration received in exchange for patent grants. The statutory scheme requires not only the development of a novel invention, but also the disclosure of technical information in exchange for a valid patent. Hence, in addition to the novelty and nonobviousness requirements of sections 102 and 103 of the United States Patent Act, the statute also requires a written description of the invention in “full, clear, concise, and exact terms,” such that the invention is enabled.<sup>56</sup> The Act further requires the inventor to describe the best mode for carrying out the invention.<sup>57</sup>

The Supreme Court has interpreted these and other provisions to conclude that the statute seeks different types of consideration in exchange for the patent monopoly. Hence, society exacts the benefit of a novel invention in exchange for the patent.<sup>58</sup> But an additional part of “the quid pro quo is disclosure of a process or device in sufficient detail.”<sup>59</sup> This is not only “to enable one skilled in the art to practice the invention once the period of the monopoly has expired,” but also “to

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53. See *infra* Part III.B.

54. *Siemens*, 637 F.3d at 1291-93 (Prost, C.J., dissenting); *Siemens*, 647 F.3d at 1378-80 (Dyk, J., dissenting, joined by Gajarsa, J. and Prost, J.); see *infra* Part III.C-E.

55. See *infra* Part III.E.

56. 35 U.S.C. §§ 102-103, 112(a) (2012).

57. *Id.* § 112(a).

58. *Pennock v. Dialogue*, 27 U.S. 1, 23 (1829).

59. *Universal Oil Prod. Co. v. Globe Oil & Ref. Co.*, 322 U.S. 471, 484 (1944).

warn the industry concerned of the precise scope of the monopoly asserted,” such that innovation can proceed around the patent claims.<sup>60</sup> The Supreme Court has explicitly recognized that a value of the patent disclosure is that it facilitates further innovation unclaimed in the patent:

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 of the eventual development of further significant advances in the art.<sup>61</sup>

And so the law anticipates the receipt of multiple forms of consideration in exchange for the patent grant. In exchange for a limited monopoly, society demands not only the value of the claimed inventions, but also the stimulation of “further significant advances in the art”—in other words, unclaimed consideration. But how does one weigh these different types of consideration against the value of claimed inventions? As the remainder of this Part concludes, scholars are reaching a consensus that unclaimed consideration is of greater value than claimed inventions.

### *B. Unclaimed Consideration as Recognized by Disclosure Theory*

Disclosure theory readily lends itself to a thesis promoting the value of unclaimed consideration. This is because disclosure theorists argue that an important goal of the patent system is to spur the creation and dissemination of the technical teachings contained in patents; not just the teachings claimed as inventions, but also the information contained in the patent specification that is not claimed as an invention. As Professor Jeanne Fromer has argued, not only does disclosure “permit[s] society at large to apply the information by freely making or using the patented invention after the expiration of the patent,” disclosure can also “stimulate others to design around the invention or conceive of new inventions—either by improving upon the invention or by being inspired by it—even during the patent term.”<sup>62</sup>

Indeed, researchers who consult patents in undertaking their research primarily make use of patent disclosures in this second way. Professor Lisa Larrimore Ouellette’s survey of nanotechnologists finds

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60. *Id.*

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

62. Fromer, *supra* note 24, at 548-49.

that the 60% of researchers who find useful information in patent literature consult patents for useful technical information, rather than in preparation for practicing the claimed inventions:

[T]he respondents who had found useful information primarily cited “useful technical detail” like “clever descriptions and useful recipes.” For example, one academic physicist wrote: “I will sometimes look at patents to see how a particular device works. Almost always some piece of lab equipment.” A chemist who works in an academic laboratory and for a startup wrote: “‘Useful’ doesn’t mean ‘insightful’ or ‘detailed’ but it certainly was useful. The data helped put the ideas and research in context and offered some plausible views as to what we were seeing in our own research.” Another chemist, who works in industry, explained: “Patents are a useful source of information on how others have approached particular technical problems and can also help [keep] you from going down a road that has already been travelled.”<sup>63</sup>

In short, it is not only (or not at all) the patented inventions that are useful to researchers. Rather, it is the unclaimed technical descriptions, which facilitate, inform, and put into perspective further research, which lead to further innovations. Indeed, although a majority of Professor Ouellette’s respondents found patent documents useful in their research, a majority also found that the actual invention disclosures were not useful: “the majority of them believe that patents do not enable a skilled researcher to reproduce the invention.”<sup>64</sup>

These findings bolster the view that the production of patent literature plays an important role in codifying industry knowledge that would otherwise remain tacit, as Professor Dan L. Burk has argued.<sup>65</sup> Certain useful industrial knowledge—for example, standard recipes, machine settings, or protocols for semiconductor fabrication—might be known in an industry, but never codified or indexed because it is simply too costly.<sup>66</sup> The patent system serves not only to spur the disclosure of novel inventions, but also results in the codification of tacit industry knowledge—prior art and industry standards against which the claimed inventions must be described and measured. The information is codified in uniform formats that “offer a considerable savings over having to examine and interpret idiosyncratic technical documents from different technology holders.”<sup>67</sup>

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63. Ouellette, *supra* note 25, at 575.

64. *Id.* at 578.

65. Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1017-27 (2008).

66. *Id.* at 1014.

67. *Id.* at 1020.

The codification of tacit industry knowledge benefits society in multiple ways, even if the knowledge is not novel or inventive. This codified knowledge can evidence prior art, such that patent claims are not given to old ideas.<sup>68</sup> It can also result in further innovation because it facilitates market entry by actors who can learn essential industry knowledge that would remain tacit in the absence of patent disclosures. Codification of tacit knowledge further spurs subsequent innovation by allowing researchers to understand what is already known and avoid the duplication of effort.

Despite this ability of patent disclosure to induce further innovations, disclosure as a goal of patent policy has come under attack by some scholars.<sup>69</sup> One line of argument denigrates the importance of disclosure with the supposition that researchers do not read patent documents, either because they are afraid of willful infringement liability or because patent documents do not contain useful information or are poorly indexed.<sup>70</sup> These assumptions turn out to be incorrect. Professor Ouellette's study showed that 60% of nanotechnologists who consult the patent literature in their research find useful technical information therein.<sup>71</sup> Even previous surveys relied upon by scholars to support the notion that researchers do not read patents do not support such a conclusion. Professor Ouellette noted that the 1994 Wesley Cohen survey, upon which scholars have based the claim that scientists do not read patents, in fact found that "49.1% of U.S. respondents indicated patents were 'moderately' or 'very important as a source of information[,] . . . less than the 61.8% who said the same of publications or the 51.3% for informal exchange, but still almost half the sample."<sup>72</sup>

Nor do researchers avoid reading patents out of a fear of willful infringement liability.<sup>73</sup> Such a fear would likely be misguided in light of the Federal Circuit's new stringent test for willful infringement, which allows any good faith theory of the noninfringement, invalidity, or unenforceability of the patent to negate the intent element of willfulness liability.<sup>74</sup> The notion that scientists avoid consulting patents because

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68. *Id.* at 1024-25.

69. *See, e.g.,* Alan J. Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. & TECH. 401, 410-12 (2010); Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 131-36 (2006).

70. *See* Devlin, *supra* note 69, at 403-04; Holbrook, *supra* note 69, at 146.

71. Ouellette, *supra* note 25, at 575.

72. *Id.* at 562-64.

73. *See id.* at 579-81.

74. *See In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (holding that in order to prove willful infringement, the patent holder has to prove by clear and convincing evidence that the infringer acted despite an objectively high likelihood that its actions constituted

they are poorly indexed may also be outdated given the ongoing development of technology to index patents, such as Google Patents and an improved USPTO website.<sup>75</sup>

The second argument against disclosure theory is that claimed inventions inevitably would be publicly disclosed, even in the absence of patent disclosure requirements.<sup>76</sup> The argument is that most patented inventions can be reverse engineered once they are commercialized. If a patented invention was not self-disclosing, there would have been no incentive to patent it because it could have been monopolized through trade secret protection for an unlimited duration.<sup>77</sup>

This argument fails for several reasons. First, the majority of patented inventions are never commercialized.<sup>78</sup> Accordingly, the majority of patented inventions are not available as commercial products, and therefore cannot be discovered through reverse engineering. Such inventions are only available in the published patent literature and would never have been described and enabled absent the patent disclosure requirements.<sup>79</sup>

Moreover, much of the information in patents that researchers find useful is unclaimed technical information, as discussed above. Such information is not necessarily obtainable through reverse engineering a patented product. Much of this information would not be disclosed absent patent disclosure requirements. As Professor Fromer concluded, “[m]uch of the information contained in—or that ought to be in—patents is not published elsewhere.”<sup>80</sup> This is because an inventor “will generally not publish information about his invention until the associated patent application becomes public.”<sup>81</sup> And because inventors have an incentive to reveal no more information about their inventions than is required, the disclosure requirements of the Patent Act ensure that “no other source

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infringement and that this objectively high risk was either known or so obvious that it should have been known to the accused infringer); see also HON. TIMOTHY B. DYK & SAMUEL F. ERNST, *Patents*, in BUSINESS AND COMMERCIAL LITIGATION IN FEDERAL COURTS § 86:32, at 997 (Robert L. Haig ed., 3d ed. 2011) (“These are two very difficult things to prove.”). In *Cohesive Techs., Inc. v. Waters Corp.*, 543 F.3d 1351, 1374 (Fed. Cir. 2008), the Federal Circuit affirmed a finding of no willful infringement on the basis that the defendant’s argument regarding the proper construction of a claim term was not objectively reckless, even though the construction was rejected by the district court and the Federal Circuit.

75. See Ouellette, *supra* note 25, at 574-75 (finding that the most common ways in which researchers find patents are through searching the USPTO website and Google Patents).

76. See Devlin, *supra* note 69, at 411; Holbrook, *supra* note 69, at 132-35.

77. Devlin, *supra* note 69, at 417-18; Holbrook, *supra* note 69, at 132-35.

78. Sichelman, *supra* note 3, at 362-63.

79. *Id.* at 363.

80. Fromer, *supra* note 24, at 554.

81. *Id.* at 554-55.

will contain as much disclosure as the patent document.”<sup>82</sup> Moreover, as discussed above, patent disclosure rules result in the disclosure of information that would otherwise remain tacit, and result in such information being codified and indexed in standard formats.<sup>83</sup>

There is no doubt that patent law could be reformed to improve the quality of patent disclosures as they are currently written.<sup>84</sup> However, disclosure as a goal of patent policy already appears to facilitate value in the form of further innovations and technical information.

### C. *Unclaimed Consideration as Recognized by Commercialization Theory*

Like disclosure theory, commercialization theory by its very nature emphasizes the value of unclaimed consideration. This is because commercialization theory stands for the proposition that the patent system should encourage the full commercialization and marketing of new products, and not just new inventions.<sup>85</sup> According to commercialization theorists, the creation of a new invention is little more than the first step in a process that may or may not lead to something far more valuable to society: an actual commercial product or process. Ted Sichelman wrote, “[a]lthough an important aim of patent law is to spur the disclosure of new and nonobvious technical information—absent consumable, commercial products incorporating this information, patent law would provide little benefits to the public.”<sup>86</sup> Accordingly, the primary consideration society should seek in exchange for granting the patent monopoly are a whole host of activities beyond the mere disclosure of a claimed invention. These activities include the development of a working prototype, market testing and marketing, distribution of the commercial product, product improvements, and so forth.<sup>87</sup> Most of this activity occurs long after the claimed invention is

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82. *Id.* at 555.

83. See Burk, *supra* note 65, at 1019-24. In addition, Jason Rantanen has forcefully argued that patent protection facilitates “peripheral disclosure,” which is “the non-patent sharing of information by an inventor that would not occur in the absence of a patent system,” such as scientific publications and product marketing. Jason Rantanen, *Peripheral Disclosure*, 74 U. PITT. L. REV. 1, 16, 21, 27 (2012).

84. See Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621, 641-57 (2010) (proposing reforms to improve patent disclosures).

85. Lemley, *supra* note 30, at 711 (“Commercialization theory . . . hypothesizes that we grant patents in order to encourage not invention but product development.”).

86. Sichelman, *supra* note 3, at 354.

87. *Id.* at 348-54 (describing the “lengthy process” of bringing a product to market, involving many steps “which are fraught with uncertainty and great expense”); Cotropia, *supra* note 7, at 89-93 (describing the process of developing a commercial product).



disclosed; as Christopher Cotropia has pointed out: “There is an enormous amount of technical and market information generated as development proceeds towards the final goal of commercial sale . . . . The process, hopefully results in a commercialized product that is technologically feasible and best meets market demand.”<sup>88</sup>

The problem, according to commercialization theory, is that the patent system fails to directly encourage this valuable commercialization activity.<sup>89</sup> Patent laws do this in multiple ways. For example, there is no requirement to make a working prototype (or an actual “reduction to practice” to use the patent jargon) prior to receiving a patent.<sup>90</sup> Accordingly, the law does not require patentees to take one of the very first steps necessary to determine if an invention is actually marketable.<sup>91</sup> Patent laws further encourage and, indeed, require, the early filing of patent applications, long before any commercialization and market testing activity could determine whether the invention as claimed could feasibly be incorporated into a commercially viable product.<sup>92</sup> Accordingly, Cotropia has written about the “folly” of early patent filing, because “the earlier in the development process a patent is filed, the less available information there will be about the invention and, more importantly, how the inventions will be used commercially.”<sup>93</sup>

The result is the creation of a vast thicket of patents, the majority of which are never commercialized, because at the time of filing, nobody knows whether the claimed inventions would be feasible commercial products.<sup>94</sup> These patents that never see the light of day would not necessarily be a problem if they remained dormant. Unfortunately, they create a patent thicket that can impede commercialization, the very

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88. Cotropia, *supra* note 7, at 88-89.

89. Sichelman, *supra* note 3, at 344 (“The upshot is that patent law confers direct encouragement to inventors who create and disclose intangible specifications, but not necessarily tangible products.”).

90. See 35 U.S.C. § 112 (2012) (requiring no actual reduction to practice in a patent application); Seymore, *supra* note 84, at 628 (“In contrast to the norms of scientific research, which focus on work actually performed, an inventor can obtain a patent without conducting a single experiment.”).

91. Seymore, *supra* note 84, at 628.

92. See 35 U.S.C. § 102 (2012) (awarding patent protection to the “first to file” an application); Cotropia, *supra* note 7, at 78-82 (discussing how the novelty provisions and the one-year statutory bar of the 1952 Patent Act encourage and require early filing and the “first to file” system of the America Invents Act magnifies these incentives).

93. Cotropia, *supra* note 7, at 88.

94. As pointed out above, the majority of patents are never commercialized. See Sichelman, *supra* note 3, at 362-64.

activity that commercialization theorists value.<sup>95</sup> Scholars have demonstrated this phenomenon in various industries, wherein a maze of claimed inventions must be navigated in order produce a commercial product.<sup>96</sup> Companies must expend tremendous resources to field an onslaught of demand letters from numerous patent holders. As one treatise recognizes:

Due to the increasing importance of patents and patent infringement litigation, it has become a fact of life for technology companies that they will receive multiple notice letters from patent-holders on a regular basis. In the current environment, a major task for in-house counsel in I.P. departments is to field these demand letters, make an assessment of which demand letters are frivolous or intended for harassment, and determine which raise valid infringement concerns. This work involves complicated investigations into the accused technology, the proper interpretation of the patent claims, and the existence of potentially invalidating prior art.<sup>97</sup>

This all amounts to a tax on innovation, particularly where the asserted patents themselves are never commercialized for the benefit of the public. Further, because the majority of patents are not commercialized,<sup>98</sup> and the majority of patent litigation is brought by nonpracticing entities,<sup>99</sup> this is more often than not the case. This is a particular problem in complex industries such as the high-tech industry, where commercial products are potentially covered by hundreds or thousands of patents.<sup>100</sup>

Commercialization theory proposes radical solutions to these problems, calling for reforms to the patent system that directly reward commercialization. William Kingston has proposed an “innovation warrant” with the purpose of “protecting innovation *directly*, instead of indirectly, through whatever protection a patent is able to give to its related invention.”<sup>101</sup> Sichelman has proposed the creation of a new type of patent, a “commercialization patent,” which would be “granted in

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95. Cotropia, *supra* note 7, at 112 (“This underdevelopment of patented invention, for the reasons articulated, can have serious consequences because it can only hamper, as opposed to promote, technological progress.”).

96. See cases cited *supra* note 6.

97. Dyk & Ernst, *supra* note 74, § 86:7, at 954.

98. Sichelman, *supra* note 3, at 362-64.

99. Feldman, Ewing & Jeruss, *supra* note 9, at 16.

100. See William Kingston, *Innovation Needs Patents Reform*, 30 RES. POL'Y 403, 407-08 (2001) (“In contrast to simple technologies such as chemicals, for which they are indispensable, patents are inherently *disadvantageous* for complex technologies. The primary reason is that if competing firms hold patents on different components of a complex technology, and they fail to cross-license them (which can happen from many causes, not all of them rational) development in an entire industry can be slowed down or even rendered impossible.”).

101. *Id.* at 416.

exchange for a commitment to commercialize a product not available in the marketplace.”<sup>102</sup> Cotropia has called for a new requirement that all patent applicants reduce their inventions to actual practice prior to patenting.<sup>103</sup> Other scholars have proposed many other such radical reforms to the patent system to address the perceived problem of undercommercialization of patented inventions.<sup>104</sup>

Although these proposals are laudable in their intentions, they all suffer from one particular defect: such radical reforms of the Patent Act are highly unlikely ever to occur. After all, the America Invents Act, was the first major patent law bill to be passed since the Patent Act in 1952, and it labored through Congress for nearly six years.<sup>105</sup> Although legislation to tackle the problem of “patent trolls” is currently making its way through Congress, it does not contain reforms of this radical nature. It is therefore highly unlikely that such major reforms to the very nature of the patent system as described above would ever become law. Moreover, even if such reforms were enacted, they may disturb the innovation ecosystem in unforeseen ways. For example, a commercialization requirement may stifle the ability of poorly funded inventors to obtain a patent.

Rather than proposing radical reform, this Article begins the task of proposing ways in which the courts can interpret the law that will attempt to protect this unclaimed consideration from the thicket of claimed inventions.<sup>106</sup>

Commercialization scholars (as well as theorists in other schools) often quarrel with disclosure theory.<sup>107</sup> However, commercialization theory and modern disclosure theory appear to agree that a substantial return society should receive in exchange for the patent grant is unclaimed consideration. Accordingly, as the courts develop patent law

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102. Sichelman, *supra* note 3, at 345.

103. Cotropia, *supra* note 7, at 119-20.

104. *See, e.g.*, Michael Abramowicz, *The Danger of Underdeveloped Patent Prospects*, 92 CORNELL L. REV. 1065, 1109-20 (2007) (proposing patent term extensions and auctions for rewarding ownership of the extended patent rights); Michael Abramowicz & John Duffy, *Intellectual Property for Market Experimentation*, 83 N.Y.U. L. REV. 337, 401-02 (2008) (proposing narrower claim interpretations, reduced status as prior art, and higher validity bars for uncommercialized patents).

105. Joe Matal, *A Guide to the Legislative History of the America Invents Act*, 21 FED. CIR. B.J. 435, 435-36 (2011).

106. *See infra* Part III.

107. *See, e.g.*, Sichelman, *supra* note 3, at 377-78 (criticizing disclosure theory on the basis that “scientists and engineers never read patents” and “technical knowledge put to no use is not worth much”); *see also, e.g., supra* text accompanying notes 69-70, 76-77.

incrementally, they should have in mind this consensus view that we must protect and encourage unclaimed consideration.<sup>108</sup>

*D. Unclaimed Consideration as a Goal of Prospect Theory*

If researchers across a particular industry recognize a problem in the art, they may engage in an innovation race, furiously investigating the problem in order to be the first to achieve a solution.<sup>109</sup> As previously stated prospect theorists view races to obtain the same innovation as wasteful—that it is inefficient for researchers in separate labs to simultaneously conduct the same research.<sup>110</sup> Edmund Kitch has written that once a problem has been investigated by one firm, “[s]ubsequent investigation of the same prospect by other firms can neither build on the knowledge obtained by the first searcher nor determine the efficient level and strategy of search based upon his failure.”<sup>111</sup> He was inspired by Yoram Barzel’s idea that innovation races are a social ill.<sup>112</sup> Kitch’s solution to the problem was that broad and early prospects should be granted to the first claimant, before too much wasteful, duplicative research and investment is expended by others: “This puts the patent owner in a position to coordinate the search for technological and market enhancement of the patent’s value so that duplicative investments are not made and so that information is exchanged among the searchers.”<sup>113</sup>

Kitch’s prescription for the perceived innovation race is problematic for many reasons. First, innovation races are not wasteful because they result in various researchers coming up with multifarious solutions and other innovations beyond the claims of the so-called winner of the patent

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108. See *infra* Part III.A.

109. In the context of prospect theory, I refer to this as an *innovation* race, rather than a *patent* race, because, as the discussion below reveals, prospect theorists maintain that the race to achieve and release an *innovation* is wasteful, and should be cut off by the awarding of a *patent* to the first “prospector,” who can then coordinate the development of the invention into an innovation. For the distinction between an “invention” and an “innovation,” see *supra* note 5 and accompanying text.

110. See Kitch, *supra* note 35, at 276.

111. *Id.*

112. *Id.* (discussing Barzel, *supra* note 39, at 351-52). However, Barzel explicitly disclaimed that innovation races were wasteful because of the duplication of efforts; instead, he considered them wasteful because they resulted in the premature development of innovations: “As considered here, the basic wasteful effect of competition lies not in duplicating the use of resources but in using these resources prematurely, when they would have earned a higher return elsewhere in the economy.” Barzel, *supra* note 39, at 352.

113. Kitch, *supra* note 35, at 276. Indeed, Kitch recognized that the patent law already encourages (and even requires) inventors to file patent applications early in the innovation process. *Id.* at 269.

race.<sup>114</sup> Moreover, inventors (or, rather, first claimants) are often not the best actors to coordinate the development of an invention into a marketable innovation.<sup>115</sup> Some of the evidence for this is that most claimed inventions are never commercialized or licensed.<sup>116</sup> Finally, as Chris Cotropia has argued, granting patent rights early is a “folly” because it results in “too many patent applications, too many patents, underdevelopment of patented technology, increased assertion of patent rights, and fuzzy patent boundaries,” among other problems.<sup>117</sup>

But what is pertinent to this Article is where prospect theory agrees with the other theories advanced in this paper: that the claimed *inventions* are not the principal valuable consideration we seek in exchange for the patent grant. Rather, prospect theorists seek efficient coordination of *innovation*, the development of those inventions into something more than is claimed—a developed prospect. Accordingly, Kitch’s acknowledged influence (Barzel),<sup>118</sup> wrote that his “model is set to determine the date for which an *innovation* is socially optimal, the date for which it maximizes profit for its owner, and its net contribution under either situation to the income (or wealth) of society.”<sup>119</sup> Barzel went on to consider the optimal time for developing an invention for “commercial use,” which requires substantial work and investment.<sup>120</sup>

Kitch advocates giving an early prospect to the first inventor, so that this first claimant has the incentive and ability to coordinate the development of that invention into a commercial product for the benefit of the public. The early and broad claim to a patented invention is not important in and of itself, but because “extensive development is required before any commercial application is possible—for example the laser, the transistor, nylon, and xerography.”<sup>121</sup> Accordingly, patent claims are necessary so that “the patent owner has an incentive to make investments to maximize the value of the patent without fear that the fruits of the investment will produce unpatentable information appropriable by competitors.”<sup>122</sup> Furthermore, Kitch has argued that these early patent rights allow first claimants to bring information about

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114. See *infra* Part II.E (discussing patent race theory).

115. Lemley, *supra* note 30, at 740-41.

116. Sichelman, *supra* note 3, at 362-64.

117. Cotropia, *supra* note 7, at 65.

118. See Kitch, *supra* note 35, at 265 (“These ideas first crystallized in response to Barzel’s essay, ‘The Optimal Timing of Innovations.’”).

119. Barzel, *supra* note 39, at 349 (emphasis added).

120. *Id.* at 348-49.

121. Kitch, *supra* note 35, at 276.

122. *Id.*

the patented product to the public without fear of appropriation and allows the inventor to coordinate the development of the innovation without wasteful duplication of resources.<sup>123</sup>

In short, as with the other theories discussed, prospect theory is concerned with society receiving more than just a claimed invention, which may remain undeveloped. Prospect theory too is concerned with society's receipt of unclaimed consideration: a commercial product that the public uses, developed without the wasteful duplication of resources. Despite its misguided prescriptions, the goals of prospect theory counsel us to promote unclaimed consideration.

*E. Unclaimed Consideration as a Goal of Patent Race Theory*

Patent race theorists challenge prospect theory's notion that patent (or innovation) races are wasteful by arguing that the patent race may result in benefits to society beyond the inventions claimed in patents. The researchers engaged in the patent race who fail to obtain the patent may in the process discover different, beneficial innovations.<sup>124</sup> As Jean Tirole has pointed out

[T]he loser of a patent race does not always lose everything; sometimes it comes up with a patent for another product (or else with more experience for the next patent race). Furthermore, monopolies created by patents are temporary, even with strict patent protection. New technologies are continuously invented to replace old ones.<sup>125</sup>

Indeed, Tirole thought that patent races had such potential benefit for innovation that "[i]t would thus be desirable to formalize successive patent races."<sup>126</sup>

Mark Lemley developed the patent race theory further by establishing that the great majority of innovations (even supposedly pioneering inventions such as the telegraph, the telephone, and the television) were the result of simultaneous development by researchers engaged in a patent race.<sup>127</sup> For example, Lemley discussed Thomas Edison and the development of the light bulb. Edison introduced the improvement of a carbonized bamboo filament, which had a higher resistance to electricity than previous filaments.<sup>128</sup> However, Willia E.

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123. *Id.* at 276-77.

124. Tirole, *supra* note 42, at 400.

125. *Id.* at 400.

126. *Id.*

127. Lemley, *supra* note 30, at 749-60.

128. *Id.* at 722-23 (discussing *Consol. Elec. Light Co. v. McKeesport Light Co.*, 159 U.S. 465 (1895)).

Sawyer and Albon Man (who sued Edison's licensees for patent infringement) had previously discovered that some sort of carbonized material (paper or wood) would work best as a filament,<sup>129</sup> and various types of incandescent lights had been developed by others around the world over many years.<sup>130</sup> Accordingly, Edison's innovation, the perfected light bulb with the use of a bamboo filament, would not have been developed absent a patent race.<sup>131</sup> Contrary to prospect theory, if an early, broad prospect had been given to Sir Humphrey Davey, an early investigator of arc lighting,<sup>132</sup> such that Davey could make the investments and research to perfect the innovation, it likely would not have resulted in the Edison light bulb. Even a broad prospect to Sawyer and Man would not likely have resulted in the perfected light bulb. This is because Edison and his team conducted extensive research, experimenting with bamboos from the Amazon and Japan, before finding a bamboo that resulted in an improvement over the many earlier innovations.<sup>133</sup> Rather than wasteful or duplicative, patent races are necessary to innovation, because "[i]nvention appears in significant part to be a social, not an individual, phenomenon."<sup>134</sup>

However, patent races do not merely result in the development of some final, claimed invention, such as the perfected light bulb. Critical to this Article, patent race theory recognizes the value of unclaimed consideration resulting from patent races. For example, patent races induce researchers to work faster, resulting in earlier inventions and the earlier expiration of patents.<sup>135</sup> Patent races induce a multitude of different solutions, reached by different researchers,<sup>136</sup> an unclaimed benefit that goes beyond the value of particular patented inventions. And finally, "inventors may work better when they are under some deadline pressure."<sup>137</sup>

Accordingly, although patent race theory: (1) refutes prospect theory (because prospect theory finds patent races wasteful); (2) quarrels

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129. *Cons. Elec. Light Co.*, 159 U.S. at 467-68.

130. *Id.* at 471 ("For many years prior to 1880, experiments had been made by a large number of persons, in various countries, with a view to the production of an incandescent light which could be made available for domestic purposes, and could compete with gas in the matter of expense."); Lemley, *supra* note 30 at 722.

131. Lemley, *supra* note 30, at 722.

132. *Id.* (citing ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, PATENT LAW & POLICY: CASES AND MATERIALS 269 (4th ed. 2007)).

133. *Id.* at 722; *Consol. Elec. Light Co.*, 159 U.S. at 472-73.

134. Lemley, *supra* note 30, at 711.

135. *Id.* at 753 (citing Duffy, *supra* note 36, at 444-45).

136. *Id.*; see also TIROLE, *supra* note 42, at 400.

137. Lemley, *supra* note 30, at 754.

with commercialization theory (because, inter alia, inventors are not good commercializers); and (3) takes issue with disclosure theory (under the misapprehension that investigators do not read patents);<sup>138</sup> in fact, patent race theory shares a common understanding with all of these other theories. All of these theories appear to recognize that the primary consideration society receives from the patent grant is unclaimed consideration, and not the actual inventions that are disclosed to the public.

*F. Unclaimed Consideration as Recognized by Signaling (or Portfolio) Theory*

According to the signaling (or portfolio) theory of patent protection, inventors and companies seek patents not only (or maybe not even) because of the right of exclusion they provide. Rather, patents, and in particular patent portfolios, convey information about the companies who own the patents.<sup>139</sup> Clarisa Long has argued that it is a “simple view” of patent protection to believe that inventors disclose their inventions in patents only reluctantly to obtain the reward of a patent monopoly.<sup>140</sup> In fact, companies pursue patents because they are a credible and efficient way of publicizing information about the company.<sup>141</sup> Patents convey a wealth of information about the company to potential investors above and beyond the particulars of any claimed invention.

Patents signal information about a company within the patent document itself about the lines of research the patentee firm is undertaking and the research and prior art of other companies that the patentee firm criticizes or recommends.<sup>142</sup> However, patents also signal information unrelated to the details of the claims and specification of the patent document. Patents signal that companies have sufficient resources to expend on research and development and the expense of prosecuting patents.<sup>143</sup> Patents also signal that a firm is willing to stand behind its research and assertions because they are written under the duty of candor to the USPTO.<sup>144</sup> In other words, patents are not mere puffery. Lemley points out that “[v]enture capitalists use client patents (or more likely,

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138. *Id.* at 738-49.

139. Holbrook, *supra* note 69, at 137.

140. Long, *supra* note 47, at 631-32.

141. *Id.* at 636.

142. *Id.* at 647.

143. *Id.*

144. *Id.* at 649.



patent applications) as evidence that the company is well managed, is at a certain stage in development, and has defined and carved out a market niche.”<sup>145</sup> According to the portfolio aspect of signaling theory, it is the number of patents a company owns that is of primary importance; far more important than the details of any particular claimed invention within that portfolio, because it would be highly inefficient for investors to assess each individual patent in a portfolio even were it possible to assess the value of a claimed invention merely by reading the patent document.<sup>146</sup>

In short, signaling theory maintains that the private value of patents is that they are a means of signaling information about their owners.<sup>147</sup> However, signaling theory also recognizes that the public value of patents is that it facilitates such signaling. This is because patent signals are an efficient way for investors to obtain information about a company at a low cost.<sup>148</sup> It is more efficient for patentee firms to gather and present information about the firm in documents blessed as credible by the federal government than it is for investors to gather and verify this information themselves.<sup>149</sup> This is particularly true with respect to private equity firms, which are not required to submit Securities and Exchange Commission (SEC) disclosures.<sup>150</sup> Patents are the SEC disclosures for start-ups.<sup>151</sup>

Accordingly, despite their potential to provide firms with the distorted incentive to obtain exclusionary rights, patent signals benefit society by reducing information costs and thereby render investing more efficient and informed with credible information.<sup>152</sup> This signaling function and the information efficiencies it creates for investing is a form of unclaimed consideration that society receives in exchange for the patent grant. Signaling theory quarrels with the other theories of patent protection for failing to explore the reasons patentees obtain patents and

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145. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1505-06 (2001).

146. Holbrook, *supra* note 69, at 138 (“The disclosure of any single patent is likely irrelevant in market signaling theory because evaluating the contents of the patent for accuracy would greatly increase costs, undermining the efficiency gains of the signal.”).

147. Long, *supra* note 47, at 647 (“Even if patents conferred no protection, firms might find it desirable to obtain them as a means of credibly advertising their inventions.”).

148. *Id.* at 644.

149. *Id.* at 645.

150. *See id.* at 671.

151. Indeed, even publicly traded companies report information regarding their patents to the SEC for the benefit of investors. *See, e.g.*, SEC Form 20F, at 11, 13, 16.

152. Long, *supra* note 47, at 676.

for assuming it is solely to obtain the exclusionary right.<sup>153</sup> However, signaling theory agrees with all of the theories discussed above in its recognition that a substantial value society receives from patents is wholly unrelated to the inventions claimed in those patents. Patents primarily signal information about companies, a form of unclaimed consideration. As such, the conclusion to be drawn from this shared insight is the same: if the primary value received in exchange for the patent grant is not claimed inventions, then we must assure that claimed inventions do not interfere with the value of unclaimed consideration.

### III. MODEST JUDICIAL REFORM TO PROTECT UNCLAIMED CONSIDERATION

#### A. *Judicial Reform and the Consensus on Unclaimed Consideration*

Thus far, this Article has argued that there is a fundamental and growing consensus among patent theorists: that a substantial or even primary consideration society receives for the patent grant is unclaimed consideration, not claimed inventions, which are usually never commercialized or licensed in any event. In light of this common understanding, why are patent theorists continually locked in disagreement over how the patent law should foster innovation? Why are we laboring under a “stalemate of empirical intuitions,” as one scholar puts it?<sup>154</sup>

It would be far more practical for patent theorists to acknowledge their basic core of agreement—the value of unclaimed consideration—and seek reforms that protect and encourage this unclaimed consideration. These need not be radical reforms, such as patent extension auctions, commercialization patents, the elimination of patents, or other such revolutions that are highly unlikely to be enacted and which could disturb the innovation ecosystem in unforeseen ways. Rather, courts, in evolving the law and deciding close questions, should always have in mind the importance of protecting unclaimed consideration. Where possible, courts should lean on the side of guarding unclaimed consideration from the thicket of patent claims that threatens it. In doing so, we can increase the likelihood that society receives the valuable unclaimed consideration it deserves in exchange for the patent grant.

This Part provides an example of how the courts should protect unclaimed consideration through the vehicle of a case study of *Siemens*

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153. *Id.* at 675.

154. Laakmann, *supra* note 21, at 44 (quoting Vermeule, *supra* note 22, at 153).

*Medical Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*<sup>155</sup> In *Siemens*, the court affirmed infringement under the doctrine of equivalents by a product that was separately patented as a nonobvious variation of the patent-in-suit.<sup>156</sup> The court reached this conclusion even though the patent office had considered the asserted patent as prior art during prosecution of the accused infringer's patent, and had determined that the accused infringer's patent was nonobvious in light of the asserted patent.<sup>157</sup> The panel opinion and the subsequent denial of rehearing en banc were each issued over a vigorous dissent,<sup>158</sup> and with good reason. The doctrine of equivalents must not be used to ensnare nonobvious variations of claimed inventions. Such follow-on innovations are the very types of unclaimed consideration received by society in exchange for the patent grant that should be fostered and protected.

*B. A Tale of Two Patents*

In the *Siemens* case, Siemens sued Saint-Gobain Ceramics & Plastics for the alleged infringement of U.S. Patent No. 4,958,080, ('080 patent) that claims a "Lutetium Orthosilicate Single Crystal Scintillator Detector."<sup>159</sup> The patent relates to an improvement in a type of nuclear medical imaging called positron emission tomography (PET).<sup>160</sup> PET scanners detect gamma rays produced by a radioisotope that is administered to a patient and convert these gamma rays into photons of visible light, which are then used to create a three-dimensional image of the patient.<sup>161</sup> The scanner converts the photons to rays of visible light by passing them through a scintillator crystal, which "is a substance that absorbs high energy radiation and, in response, fluoresces photons at a specific, longer wavelength, releasing the previously absorbed energy."<sup>162</sup>

The inventor of the '080 patent did not, of course, invent positron emission tomography or the idea that gamma rays can be converted to visible light to create three dimensional images or even that this should

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155. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269 (Fed. Cir. 2011), *reh'g en banc denied*, 647 F.3d 1373 (Fed. Cir. 2011), *cert. denied*, 132 S. Ct. 2679 (May 29, 2012).

156. *Id.* at 1283-84.

157. *Id.* at 1284.

158. *Id.* at 1291-93 (Prost, C.J., dissenting); *Siemens*, 647 F.3d at 1378-80 (Dyk, J., dissenting, joined by Gajarsa & Prost, JJ.).

159. U.S. Patent No. 4,958,080 (filed Aug. 4, 1989) [hereinafter '080 Patent].

160. *Siemens Med. Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 615 F. Supp. 2d 304, 307 (D. Del. 2009) (granting in part and denying in part judgment as a matter of law).

161. *Id.*

162. *Id.* at 307 n.1.

be done by passing the gamma rays through a scintillator.<sup>163</sup> Rather, the '080 patent claims a gamma ray or x-ray detector using a particular type of single crystal scintillator among many other single crystal scintillators already known in the art.<sup>164</sup> The patent concedes that “[a] well-known form of detector for gamma rays. . . employs a transparent single crystal, known as a scintillator, which responds to impinging radiation to emit light pulses.”<sup>165</sup> It further concedes that there are a wealth of single crystal scintillators known in the art, including thallium-doped sodium iodide, cesium iodide, bismuth germinate, naphthalene, anthracene, and stilbene.<sup>166</sup> All of these scintillators have problems, according to the patentee, such as “low radiation detection efficiency, slow scintillation decay, and large and persistent afterglow.”<sup>167</sup> But the '080 patent was not the first patent to solve these problems either. Rather, the patentee observed that “[m]ore recently, a gamma ray detector employing a scintillator formed of a single crystal of cerium-activated gadolinium orthosilicate (GSO) has been proposed”; these GSO scintillators solve many of the problems with previous scintillators, and were patented by another person for use in positron computed tomography.<sup>168</sup> What the patentee and his co-workers discovered was the use of a GSO scintillator “as a gamma ray detector in the hostile conditions of borehole logging.”<sup>169</sup> However, the patent does not claim that invention either; it is claimed in a different patent filed by the patentee and his co-workers that was not at issue in the suit.<sup>170</sup> Rather, the patent was conceived when the inventor, building on all of the above knowledge and innovations, “consider[ed] other rare earth compounds as possible scintillators for gamma ray (and like) detection.”<sup>171</sup> As a result of this research, the patent discloses and claims the use of yet one more type of scintillator, a single crystal of cerium-activated lutetium oxyorthosilicate,<sup>172</sup> or as the district court called it, an “LSO crystal.”

I describe the history and invention of the '080 Patent in this way not to belittle its claimed invention, but rather to emphasize the incremental nature of innovation. The patent was not a “pioneering”

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163. '080 Patent, *supra* note 159.

164. *Id.* at 3:10-14 & claim 1.

165. *Id.* at 1:12-15.

166. *Id.* at 1:24-39.

167. *Id.* at 1:40-63.

168. *Id.* at 1:64-2:18 (“Such a GSO scintillator is describe in U.S. Pat. No. 4,647,781, issued Mar. 3, 1987, for use in positron computed tomography.”).

169. *Id.* at 2:18-20.

170. *Id.* at 2:20-29.

171. *Id.* at 2:31-33.

172. *Id.* at 3:10-15 & cl. 1.

invention, if such a thing indeed exists, but an incremental improvement over the prior art comprising the use of a new type of scintillator after many others had been used effectively before.

The accused product in the *Siemens* case also represented a further, incremental step in the art. Saint-Gobain's accused scintillator comprised a single crystal of lutetium yttrium orthosilicate.<sup>173</sup> In other words, "[i]n contrast to the LSO crystals of the '080 patent, which contain only lutetium, defendant's LYSO crystals represent a 10% (by mole) substitution of the element yttrium for lutetium."<sup>174</sup> There is no need to wonder if it were a minor or obvious advance for the defendant to substitute yttrium for lutetium because the USPTO already answered that question; the USPTO decided that the defendant's scintillator was a separately patentable, nonobvious invention after considering the '080 patent as prior art.<sup>175</sup> The accused product was claimed by a patent licensed by Saint-Gobain, U.S. Patent No. 6,624,420 ('420 patent). The '420 patent claimed "[a] scintillator detector for high energy radiation comprising: a monocrystalline structure of cerium doped lutetium yttrium orthosilicate."<sup>176</sup> The inventors of the '420 patent disclosed to the USPTO that the single crystal lutetium orthosilicate scintillator had already been invented and claimed by the '080 patent.<sup>177</sup> However, they pointed out that "the lutetium element of the crystal contains a trace amount of a natural long decay radioactive isotope," which causes problems with the use of that scintillator under certain conditions.<sup>178</sup> Accordingly, the patent inventors offered an incremental improvement, similar to the incremental improvement offered by the inventor of the '080 patent. The scintillator claimed in the '420 patent substitutes yttrium for much of the lutetium claimed by the '080 patent.<sup>179</sup> Critically, during the prosecution of the '420 patent, the USPTO considered the prior art '080 patent and determined that the '420 patent was a separately patentable invention that would not have been obvious to one of ordinary skill in the art in light of the '080 patent.<sup>180</sup>

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173. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 615 F. Supp. 2d 304, 307 (D. Del. 2009).

174. *Id.*

175. U.S. Patent No. 6,624,420 (filed Feb. 17, 2000) [hereinafter '420 Patent].

176. *Id.* at cl. 1 (emphasis added).

177. *Id.* at "References Cited" & 2:28-44.

178. *Id.* at 2:40-60.

179. *Id.* at 3:34-36.

180. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, No. 07-190-SLR, 2008 WL 114361 (D. Del. Jan. 8, 2008) (denying preliminary injunction). Siemens did not challenge the USPTO's conclusion that the '420 patent claimed a nonobvious, separately patentable invention in the court proceedings. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain*

Perhaps most importantly for the purpose of this Article, the accused Saint-Gobain product was a commercially successful follow-on innovation to the '080 patent that was appreciated by the public. Even the Federal Circuit panel majority that later affirmed Saint-Gobain's infringement admitted to "the commercial success of [Saint-Gobain's] 10% Y LYSO crystals."<sup>181</sup> As a commercially successful follow-on innovation that did not literally infringe the '080 patent, the Saint-Gobain scintillator was the very type of unclaimed consideration society deserved to receive in exchange for granting the '080 patent monopoly.

### C. *The Siemens District Court Proceedings*

Siemens sued Saint-Gobain and moved for a preliminary injunction to prohibit Saint-Gobain from selling its LYSO scintillator pending trial.<sup>182</sup> Because the Saint-Gobain scintillator substituted yttrium for much of the lutetium claimed by Siemens's '080 patent, Siemens conceded that there could be no literal infringement.<sup>183</sup> Accordingly, the issue was whether Saint-Gobain was likely to prevail in proving that the Saint-Gobain scintillator infringed under the doctrine of equivalents.<sup>184</sup>

The doctrine of equivalents allows patent holders to prove accused products infringe a claim even if they do not meet each of the claim limitations defining the invention.<sup>185</sup> In theory, the doctrine of equivalents should capture only "insubstantial changes and substitutions . . . which, though adding nothing, would be enough to take the copied matter outside the claim, and hence outside the reach of law."<sup>186</sup>

Prior to the *Siemens* case, the Federal Circuit had not directly considered whether an accused product that was separately patented as nonobvious in light of the asserted patent could nonetheless be proven to infringe under the doctrine of equivalents. In other words, could an adjudged nonobvious variation of a patented invention nonetheless be nothing more than an "insubstantial change" over the first invention and equivalently infringe the first patent? In one of its *Festo* decisions, the court stated:

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Ceramics & Plastics, Inc., 637 F.3d 1269, 1283 (Fed. Cir. 2011) ("Siemens . . . stopped short of directly challenging the validity of the '420 Patent." (internal citations omitted)).

181. *Siemens*, 637 F.3d at 1282.

182. *Siemens*, 2008 WL 114361, at \*1.

183. *Id.* at \*3 n.7.

184. *Id.* at \*3.

185. *Id.*

186. *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607 (1950).

We have not directly decided whether a device—novel and separately patentable because of the incorporation of an equivalent feature—may be captured by the doctrine of equivalents, although we have held that when a device that incorporates the purported equivalent is in fact the subject of a separate patent, a finding of equivalency, while perhaps not necessarily legally foreclosed, is at least considerably more difficult to make out. But there is a strong argument that an equivalent cannot be both non-obvious and insubstantial.<sup>187</sup>

The district court considered this Federal Circuit dictum and denied Siemens's motion for a preliminary injunction, finding that Siemens had not established a likelihood of success on the merits of proving equivalent infringement. Because the Saint-Gobain scintillator was deemed nonobvious by the USPTO in light of the asserted '080 patent, the district court concluded that Saint-Gobain "ha[d] a strong argument that its LYSO [was] both novel (nonobvious) and substantially different from [Siemens's claimed] LSO."<sup>188</sup>

Eight months later, however, a jury found that Saint-Gobain's scintillator did infringe the '080 patent under the doctrine of equivalents and awarded Siemens \$52.3 million in damages.<sup>189</sup> Saint-Gobain moved for a new trial on the finding of equivalent infringement.<sup>190</sup> Among Saint-Gobain's arguments was that its crystal could not simultaneously be separately patentable as nonobvious over the asserted patent and also

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187. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 493 F.3d 1368, 1379-80 (Fed. Cir. 2007); *see also* *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 954 (Fed. Cir. 1993) (finding no equivalent infringement) ("[T]he USPTO must have considered the accused product to be nonobvious with respect to the patented composition. Accordingly, the issuance of that patent is relevant to the equivalence issue."); *Zygo Corp. v. Wyko Corp.*, 79 F.3d 1563, 1570 (Fed. Cir. 1996) ("The accused patented device is] presumed nonobvious . . . [and] [t]he nonobviousness . . . is relevant to the issue of whether the change therein is substantial"); *Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1128 (Fed. Cir. 1996) (Nies, J., additional views) ("A substitution in a patented invention cannot be both nonobvious and insubstantial."). *But see* *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1582 (Fed. Cir. 1996) ("In a case finding literal infringement] [t]he fact of separate patentability presents no legal or evidentiary presumption of noninfringement and, in this case, does not outweigh the substantial evidence supporting the jury verdict of infringement"); *Glaxo Wellcome, Inc. v. Andrx Pharm., Inc.*, 344 F.3d 1226, 1233 (Fed. Cir. 2003) ("Although [separate patentability] may be weighed by the district court, particularly if there is an issue of 'insubstantial' change with respect to equivalency, separate patentability does not automatically negate infringement."); *Nat'l Presto Indus., Inc. v. W. Bend Co.*, 76 F.3d 1185, 1191-92 (Fed. Cir. 1996) ("Improvements or modifications may indeed be separately patentable if the requirements of patentability are met, yet the device may or may not avoid infringement of the prior patent.").

188. *Siemens*, 2008 WL 114361, at \*6.

189. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 615 F. Supp. 2d 304, 307 (D. Del. 2009).

190. *Id.*

infringe that patent under the doctrine of equivalents.<sup>191</sup> At the very least, Saint-Gobain argued, “[Siemens] was required to prove that its 10% Y LYSO crystals are insubstantially different from the ‘080 patent claims under the higher ‘clear and convincing’ standard of proof.”<sup>192</sup> The district court declined to decide these legal questions because they had never been decided by the Federal Circuit:

Defendant freely admits that it cannot cite a case requiring infringement to be proven by clear and convincing evidence; defendant seeks Federal Circuit review of its argument as a matter of first impression. The court finds defendant’s position untenable and declines to be the first (and only) court to depart from an extended history of patent infringement jurisprudence applying the preponderance of the evidence standard.<sup>193</sup>

Accordingly, the district court denied Saint-Gobain’s request for a new trial.<sup>194</sup>

The court’s decision to deny Saint-Gobain a new trial on equivalent infringement, even after it had previously denied Siemens a preliminary injunction for equivalent infringement, necessarily hinged on the different standards of review governing the two motions. On the preliminary injunction motion, Siemens had the burden of proving that it was likely to succeed on the merits of its claim that Saint-Gobain equivalently infringed the ‘080 patent.<sup>195</sup> Because this standard was more favorable to Saint-Gobain, the Federal Circuit’s dictum counseling against equivalent infringement in these circumstances tipped the scale in Saint-Gobain’s favor: “As the Federal Circuit has noted, defendant has a ‘strong argument’ that its LYSO is both novel (non-obvious) and substantially different from LSO.”<sup>196</sup> However, with a jury verdict of equivalent infringement, the odds of Saint-Gobain obtaining a new trial were very slim. The district court would only grant a new trial if the jury instructions on equivalent infringement “result[ed] in a miscarriage of justice warranting a new trial.”<sup>197</sup> Favorable dictum from the Federal Circuit on an issue that had never been decided was insufficient for Saint-Gobain to meet such a burden in the district court.<sup>198</sup> As the court

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191. *Id.* at 310.

192. *Id.*

193. *Id.*

194. *Id.*

195. *Siemens Med. Sols. USA, Inc., v. Saint-Gobain Ceramics & Plastics, Inc.*, No. 07-190-SLR, 2008 WL 114361, at \*3 (D. Del. Jan. 8, 2008).

196. *Id.* at \*5.

197. *Siemens*, 615 F. Supp. 2d at 311.

198. *Id.*



noted, “defendant seeks Federal Circuit review of its argument as a matter of first impression.”<sup>199</sup>

And so Saint-Gobain moved on to the Federal Circuit to obtain such review.

#### *D. The Federal Circuit Panel Opinion in Siemens*

Unlike the district court, the Federal Circuit was in a position to decide the legal question de novo.<sup>200</sup> To wit, can an accused product that was separately patented as nonobvious over the asserted patent nonetheless be “insubstantially different” so as to infringe under the doctrine of equivalents? At the very least, should the plaintiff face a heightened burden of proving equivalent infringement under such circumstances?<sup>201</sup> Because there was no binding Supreme Court precedent on the issue, here was an opportunity for the Federal Circuit to lean on the side of the scholarly consensus identified above,<sup>202</sup> protecting unclaimed consideration.

Two of three judges on the panel failed to seize this opportunity. Judge Lourie’s majority opinion acknowledged that “Saint-Gobain makes an interesting argument, not illogical, (and ably articulated by the dissent) regarding a correspondence between the nonobviousness of an accused product, as shown by its separate patentability, and its infringement of another patent under the doctrine of equivalents.”<sup>203</sup> Despite the logic of Saint-Gobain’s position that a nonobvious improvement of a claimed invention cannot also be insubstantially different from that invention, the majority declined to disturb the judgment of equivalent infringement.<sup>204</sup> Much of the majority decision was devoted to pointing out that Saint-Gobain had no precedent directly supporting its position.<sup>205</sup> However, if

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199. *Id.* at 310.

200. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1278 (Fed. Cir. 2011) (“[T]he standard of review on a motion for a new trial is abuse of discretion *unless* the court’s denial of the motion is based on application of a legal precept, in which case our review is plenary.” (emphasis added)) (quoting *Curley v. Klem*, 499 F.3d 199, 206 (3d Cir. 2007)); *see also id.* (“Whether a jury instruction is erroneous is legally a question of law.”).

201. *Id.*

202. *See infra* Part II.

203. *Siemens*, 637 F.3d at 1279.

204. *Id.* at 1291.

205. *Id.* at 1280 (noting that the statement in *Festo* that equivalent infringement “is at least considerably more difficult to make out” under these circumstances was dictum) (quoting *Festo Corp. v. Shoketsu Kinzoku Kabushiki Co.*, 493 F.3d 1368, 1379-80 (Fed. Cir. 2008)); *id.* (noting that Judge Nies’s statement that “[a] substitution in a patented invention cannot be both nonobvious and insubstantial” was not in a precedential opinion) (quoting *Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1128 (Fed. Cir. 1996) (Nies, J., additional views)).

the issue was a matter of first impression, this was exactly what gave the Federal Circuit the opportunity to develop the law in favor of unclaimed consideration.

The majority asserted that the issue had been addressed by the 1929 case *Sanitary Refrigerator Co. v. Winters*,<sup>206</sup> in which the Supreme Court declined to vacate a finding of equivalent infringement supported by “undisputed facts” on the basis that the accused product was subject to a separate patent.<sup>207</sup> The majority quoted the *Sanitary Refrigerator* opinion for the proposition, “[n]or is the infringement avoided . . . by any presumptive validity that may attach to the Schrader patent by reason of its issuance after the Winters and Crampton patent.”<sup>208</sup> However, the majority’s ellipsis conceals a critical phrase in the Supreme Court’s statement, which reads in full, “[n]or is the infringement avoided, *under the controlling weight of the undisputed facts*, by any presumptive validity that may attach to the Schrader patent by reason of its issuance after the Winters and Crampton patent.”<sup>209</sup> As Judge Dyk argued in his dissent from the denial of the petition for rehearing en banc, in *Sanitary Refrigerator* the facts were undisputed that the accused equivalent was “merely a colorable departure from the [claimed] structure” and a “close copy which [sought] to use the substance of the invention . . . [to] perform precisely the same offices with no change of principle.”<sup>210</sup> “Evidently, the Court found that the ‘controlling weight of the undisputed facts’ overcame the subsequent patent’s presumption of validity, not that the presumption of validity was irrelevant.”<sup>211</sup> This is in contrast to *Siemens*, where there were copious disputed facts regarding equivalent infringement, because the question had to be decided by a jury following the district court’s finding that Siemens had failed to prove that it was likely to prevail on the merits of proving equivalent infringement.<sup>212</sup> But most critically, there is no indication in *Sanitary Refrigerator* that the patent on the accused product issued as novel and nonobvious after the USPTO explicitly examined the asserted patent, as occurred in

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206. *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30 (1929).

207. *Siemens*, 637 F.3d at 1280 (discussing *Sanitary Refrigerator*, 280 U.S. at 36-43).

208. *Id.* at 1280 (quoting *Sanitary Refrigerator*, 280 U.S. at 43).

209. *Sanitary Refrigerator*, 280 U.S. at 43 (emphasis added).

210. *Id.* at 41-42 (quoted in *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 647 F.3d 1373, 1380 (Fed. Cir. 2011) (Dyk, J., dissenting from the denial of the petition for rehearing en banc)).

211. *Siemens*, 647 F.3d at 1380 (Dyk, J., dissenting from the denial of the petition for rehearing en banc).

212. *See supra* Part III.B.

*Siemens*.<sup>213</sup> Accordingly, there was no binding precedent to prevent the Federal Circuit from protecting the unclaimed consideration represented by Saint-Gobain's follow-on innovation from the snares of a patent over which it issued as nonobvious.

The panel majority rejected Saint-Gobain's argument that a nonobvious improvement could not be an insubstantially different equivalent by pointing out that the tests for nonobviousness and equivalent infringement are articulated differently. "The doctrine of equivalents... typically involves application of the insubstantial difference test, usually via the function-way-result-test," wrote the majority.<sup>214</sup> "Obviousness, by contrast, requires analysis under the four *Graham* factors."<sup>215</sup> This is a distinction that makes little difference in this context. Granted, the *Graham* factors do not speak *explicitly* of an "insubstantial difference." Rather, those factors require the court to determine, *inter alia*, whether the differences between the prior art and the claims at issue are sufficiently minor to render the invention obvious.<sup>216</sup> In determining "the difference" between the prior art and the patented claims, the courts undertake an exercise that is intellectually indistinguishable from the exercise of determining whether an accused equivalent is "insubstantially different" from an asserted claim.<sup>217</sup>

The majority further pointed out that the nonobviousness inquiry is different from equivalent infringement because it takes into account secondary considerations, such as "objective evidence of commercial success" of the accused product.<sup>218</sup> But as the majority conceded, the Saint-Gobain's accused product was a tremendous commercial success.<sup>219</sup> If the accused product's substitution of yttrium for lutetium was so substantially different from the '080 patent as to be technically nonobvious, and this substitution also resulted in commercial success, why wasn't that commercial success further evidence that the Saint-

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213. See *Sanitary Refrigerator*, 280 U.S. at 43 ("Nor is infringement avoided, under the controlling weight of the undisputed facts, by any presumptive validity that may attach to the Schrader patent by reason of its issuance after the Winters and Crampton patent.").

214. *Siemens Med. Solutions USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d at 1282 (Fed. Cir. 2011).

215. *Id.* (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

216. *Graham*, 383 U.S. at 17 (1966).

217. *Siemens*, 637 F.3d at 1292 (Prost, J., dissenting) ("If a skilled artisan, at the time of the accused infringement, viewed a substitution to a patented invention as insubstantially different from the claim, the substitution is equivalent and infringement may arise.") (citing *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 606, 609 (1950) ("An important factor is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.")).

218. *Siemens*, 637 F.3d at 1282.

219. *Id.*

Gobain product was more than insubstantially different from the '080 patent?

In her dissent from the majority opinion, Judge Prost traced this unavoidable similarity between the obviousness inquiry and the equivalent infringement test, finding that “there is an inevitable area of overlap.”<sup>220</sup> Judge Prost reasoned as follows:

Assume a court, applying *Graver Tank* and its progeny, found that to a person of skill in the art a substitution was insubstantially different from a claim limitation. Having so found, and setting aside (for the moment) consideration of the time frames at which obviousness and equivalence are assessed, the court would need only a further finding that the skilled artisan had some reason to make the substitution to find the limitation obvious under *Graham* and *KSR*. This is not a high bar. For a truly insubstantial change, the predictability of outcome when substituting the one for the other suggests that a reason to combine will be easy to prove.<sup>221</sup>

In short, the logic is compelling that an accused product that is patentably distinct and nonobvious in light of an asserted patent claim cannot be “insubstantially different” from that patent claim such that it infringes under the doctrine of equivalents. To quote Judge Nies, “[a] substitution in a patented invention cannot be both nonobvious and insubstantial.”<sup>222</sup> Given this compelling logic, and given that the Federal Circuit was not bound by any Supreme Court precedent, why not hold that there is no equivalent infringement under these circumstances? The Saint-Gobain accused product was a commercially successful, nonliterally infringing follow-on innovation to the '080 patent.<sup>223</sup> It was, therefore, precisely the type of unclaimed consideration society sought in exchange for granting the '080 patent monopoly. The panel majority,

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220. *Id.* at 1292.

221. *Id.* (Prost, J., dissenting). The majority pointed out that the equivalent infringement and obviousness inquiries are further different because they are analyzed from different time frame perspectives. The obviousness inquiry asks whether an invention would have been obvious at the time of invention. Equivalent infringement asks whether an accused product was insubstantially different from the asserted patent at the time of infringement. *See id.* But the majority offered no reason why this compels the conclusion that a nonobvious improvement of a patented invention can nonetheless be insubstantially different from that invention. If Saint-Gobain's patented product was not obvious in light of the '080 invention on February 17, 2000, when the '420 patent application was filed, how could that same Saint-Gobain patented product be insubstantially different from the '080 invention in January 2008 when Siemens accused it of equivalent infringement? What happened between 2000 and 2008 to make something that was patentably distinct and nonobvious from the '080 patent become insubstantially different from the '080 patent? The *Siemens* panel majority offered no explanation.

222. *Roton Barrier Inc., v. Stanley Works*, 79 F.3d 1112, 1128 (Fed. Cir. 1996) (Nies, J., additional views).

223. *Siemens*, 637 F.3d at 1282.

when given the opportunity, should not have allowed the '080 patent to ensnare by equivalents the very unclaimed consideration in return for which that patent was granted.

*E. The Denial of Rehearing En Banc and the Danger Posed by the Doctrine of Equivalents to Unclaimed Consideration*

The legal question posed by the *Siemens* case was contentious and closely decided. The Federal Circuit's order denying Saint-Gobain's petition for rehearing en banc (often a routine, one-line affair) was this time accompanied by three separate concurring opinions and a dissent in which three judges joined.<sup>224</sup> The opinions hint at a distinct difference in perspective on patent philosophy among the members of the court and also reveal the danger the doctrine of equivalents poses to unclaimed consideration.

Judge Dyk's opinion, dissenting from the denial of rehearing, framed the issue as follows: "whether, under the doctrine of equivalents, a patent claim's scope can encompass a new and separately patented (or patentable) invention."<sup>225</sup> This framing of the inquiry reveals a concern for the power claimed inventions have to swallow by equivalents follow-on innovations: nonobvious improvements to a claimed invention that are a critical component of the unclaimed consideration society receives in return for the patent grant. This perspective becomes more pronounced as the opinion discusses the proper function and scope of the doctrine of equivalents:

The theory of the doctrine of equivalents is that an inventor should receive protection for the full scope of his invention, even if the claim language does not literally cover it. *The doctrine of equivalents is not designed to enable the patent holder to secure the rights to a new invention that the inventor did not create.*<sup>226</sup>

The doctrine of equivalents was originally recognized to prevent copyists from avoiding infringement on a technicality by making some minor, insubstantial change to the patented invention.<sup>227</sup> "[T]o permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing."<sup>228</sup> For that reason the proper scope of the doctrine is to

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224. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 647 F.3d 1373 (Fed. Cir. 2011) (on petition for rehearing en banc).

225. *Id.* at 1378 (Dyk, J., dissenting from the denial of rehearing en banc).

226. *Id.* at 1379 (emphasis added).

227. *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 606, 607 (1950).

228. *Id.*

prohibit “the unscrupulous copyist” from making “unimportant and insubstantial changes and substitutions in the patent that though adding nothing, would be enough to take the copied matter outside the claim, and hence outside the reach of law.”<sup>229</sup>

Correspondingly, the doctrine should not be stretched to encompass changes and substitutions that *do* add something, changes substantial enough to constitute a further innovation that provides further benefit to the public. As Judge Dyk argued, “a product cannot be insubstantially different if it is nonobvious and separately patentable.”<sup>230</sup> If the doctrine is used to ensnare follow-on, nonobvious innovations, “this approach will deter innovation and hamper legitimate competition.”<sup>231</sup> In short, the majority’s approach threatened to allow patents to hamper unclaimed consideration, and as the various schools of patent theory increasingly recognize, unclaimed consideration is the very benefit society should receive in exchange for the patent grant.<sup>232</sup>

The three concurrences in the denial of rehearing display a wholly different approach. Judge Lourie opined, “Contrary to the dissent’s assertion that our decision ‘will deter innovation and hamper legitimate competition,’ this case exemplifies the patent system working as it should to enforce a patentee’s right to exclude—the only right embodied in the grant of a patent.”<sup>233</sup> In her separate opinion, Judge Newman elaborated on this theme that broadening the reach of patent claims through the doctrine of equivalents fosters innovation.<sup>234</sup> Judge Newman was concerned that limiting the doctrine of equivalents to nonobvious modifications would “diminish . . . the economic incentive to create new products.”<sup>235</sup> She developed this incentive theory further by quoting at length from her separate opinion in the en banc *Festo* decision:

A national economic policy that weighs on the side of fostering development and investment in new technology will have a different approach to the law of equivalency than an economic policy aimed at facilitating competition by minor change in existing products. Any tightening or loosening of access to the doctrine of equivalents shifts the balance between inventor and copier.<sup>236</sup>

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229. *Id.*

230. *Siemens*, 647 F.3d at 1379 (Dyk, J., dissenting from the denial of rehearing en banc).

231. *Id.* at 1380.

232. *See supra* Part II.

233. *Siemens*, 647 F.3d at 1375 (Lourie, J., concurring in the denial of rehearing en banc).

234. *Id.*

235. *Id.* at 1376 (Newman, J., concurring in the denial of rehearing en banc).

236. *Id.* at 1377 (quoting *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1379 (Fed. Cir. 2003) (en banc) (Newman, J., concurring in part and dissenting in part)).

Judge Newman went on to argue that if the doctrine of equivalents were cabined, “[t]he consequences for the innovation incentive are not addressed.”<sup>237</sup>

Judge Newman’s concurrence is therefore wholly grounded in the reward theory of patents.<sup>238</sup> The reward theory maintains that the primary purpose of the patent laws is to provide an “incentive to invent.”<sup>239</sup> Because information can be freely appropriated, researchers need the incentive of a patent in order to make inventions.<sup>240</sup> Hence, when the Constitution seeks “[t]o promote the Progress of Science and the useful Arts” by giving Congress the power to issue patents, the sole measure of that “Progress” is the receipt by society of patented inventions.<sup>241</sup>

The problem is that the reward theory, although it enjoys a fine lineage, has been subjected to a wide body of literature pointedly criticizing its premises and conclusions for at least forty years. The point upon which the various modern theories of patent law discussed above agree is that incentivizing claimed inventions alone is not a sufficient justification for the patent system.<sup>242</sup> In brief, disclosure theory maintains that patent rights are granted to encourage the *publication* of claimed inventions and also other technical information.<sup>243</sup> Commercialization theory maintains that patent law should encourage *innovation*—the full development of commercial products—rather than just new inventions.<sup>244</sup> Prospect theory maintains that early, broad patent rights are granted so that first claimants have an incentive and ability to coordinate the development of inventions into innovations without the wasteful duplication of efforts.<sup>245</sup> Patent race theory maintains that the patent laws should encourage patent races, because innovations are achieved incrementally when multiple researchers investigate the same problem, and many important advances are achieved by the losers of patent races.<sup>246</sup> Patent signaling theory argues that a primary value of patents are not in their claimed inventions at all; rather, patents are valuable

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237. *Id.*

238. *See supra* Part I (describing the reward theory).

239. NARD, *supra* note 15, at 31.

240. *See id.*; *see also* Grady & Alexander, *supra* note 16, at 310-11 (citing ADAM SMITH, THE WEALTH OF NATIONS 189, 339 (James E. Thorold Rogers ed., 2d ed. Oxford, The Clarendon Press 1880) (1776); JOHN B. CLARK, ESSENTIALS OF ECONOMIC THEORY 358-72 (photo. reprint 1968) (1927)).

241. U.S. CONST. art. I, § 8, cl. 8.

242. *See supra* Part II.

243. *See supra* Part II.B.

244. *See supra* Part II.C.

245. *See supra* Part II.D.

246. *See supra* Part II.E.

because they efficiently signal information about companies to allow for efficient and informed investment.<sup>247</sup> Judge Newman's concurring opinion in *Siemens* disregarded all of these alternative justifications for the patent system when she focused only on fostering the incentive for making claimed inventions.

In discussing "the innovation incentive," the concurring opinions in *Siemens* failed to recognize that encouraging claimed inventions is not the only way to promote "Progress." The accused Saint-Gobain product was also an innovation, and a commercially successful innovation at that.<sup>248</sup> In fact, it embodied a nonobvious, separately patentable, improvement over the claims of the asserted '080 patent.<sup>249</sup> The Saint-Gobain product therefore represents an important aspect of the unclaimed consideration society received in exchange for granting the '080 patent monopoly. How does it help innovation if we stretch the claims of the '080 patent to ensnare follow-on innovations that are patentably distinct from it—if we "enable the patent holder to secure the rights to a new invention that the inventor did not create[?]"<sup>250</sup> This is the innovation incentive that is not addressed by the *Siemens* concurring opinions. The concurring opinions in *Siemens* also did not consider whether focusing myopically on encouraging claimed *inventions* is an effective way to encourage *innovations* when the majority of claimed inventions are never commercialized for the benefit of the public.

This is the danger of the doctrine of equivalents. To the extent patent claims are expanded through the doctrine of equivalents to encompass more than insubstantial changes to patented inventions, the doctrine may be used to enjoin or tax with damages the very unclaimed consideration patent law should be engineered to promote. This danger is thrown into stark relief by Chief Judge Rader's concurring opinion in *Siemens*. Judge Rader wrote that the doctrine of equivalents was properly cabined because "if an equivalent was foreseeable as available technology at the time of filing, the applicant has an obligation to claim that technology."<sup>251</sup> Conversely, "the doctrine of equivalents allows patent owners to cover after-arising technology."<sup>252</sup> And so the current state of

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247. See *supra* Part II.F.

248. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1282 (Fed. Cir. 2011).

249. See *supra* Part III.B.

250. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 647 F.3d 1373, 1379 (Fed. Cir. 2011) (Dyk, J., dissenting from the denial of rehearing en banc).

251. *Id.* at 1376 (Rader, J., concurring in the denial of rehearing en banc).

252. *Id.* (citing *Johnson & Johnson Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046 (Fed. Cir. 2002) (en banc)).



the law provides for the following perverse result with respect to follow on innovations: if an accused equivalent was foreseeable—a modification so obvious that the inventor could have explicitly claimed it at the time of invention—it may escape infringement under the doctrine of equivalents. However, if an accused technology embodies later developed technology—an advance that the inventor could not have foreseen or claimed at the time of invention—then it might well be ensnared by the doctrine of equivalents. As James R. Holbrook observed, “[t]he patent system is arguably providing a windfall: it protects an invention the patent holder did not invent, and furthermore *could not* have invented.”<sup>253</sup> A broad reading of the doctrine of equivalents threatens to ensnare some of the very unclaimed consideration—further, nonobvious advances and innovations—that is the primary benefit society receives in exchange for granting patents.

Nor is this danger to unclaimed consideration posed by the doctrine of equivalents effectively tempered by the phenomenon of “blocking patents.” The blocking patents doctrine begins with the recognition that a party that literally practices each of the limitations of a claimed invention generally does not avoid infringement by adding additional features.<sup>254</sup> However, the additional features may render the infringing product sufficiently novel and nonobvious that it qualifies for a patent in its own right, an “improvement patent.”<sup>255</sup> The owner of the improvement patent still suffers from an inability to practice her improvement because it will still infringe the first patent, the “dominant patent.”<sup>256</sup> But nor may the owner of the dominant patent practice the second, improvement patent.<sup>257</sup> Theoretically, under such circumstances, the parties will have an incentive to cross-license their patents so that each may practice the improved innovation.<sup>258</sup> The public will thereby benefit from the commercialization of the improvement.

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253. See Timothy R. Holbrook, *Equivalency and Patent Law's Possession Paradox*, 23 HARV. J.L. & TECH. 1, 6 (2009).

254. NARD, *supra* note 15, at 457 (“Literal infringement cannot be avoided if the accused device contains additional elements not found in the claim.”). This is assuming the claim preamble concludes with the word “comprising,” rather than the phrase, “consisting of.” *Id.* (“The term comprising raises a presumption that the list of elements is nonexclusive . . . . In contrast, use of the transition phrase ‘consisting of’ indicates that the claim is closed (that is, that invention is limited to no more and no fewer than the listed limitations).” (internal citations and quotation marks omitted)).

255. JANICE M. MUELLER, PATENT LAW 18 (4th ed. 2013).

256. *Id.* at 19.

257. *Id.*

258. *Id.* (citing Robert P. Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 TENN. L. REV. 75 (1994)).

Also in theory, the blocking patents doctrine should assuage the concerns I raise with a patent excluding under a broad doctrine of equivalents a USPTO-certified nonobvious improvement on that patented invention. After all, Siemens should have had a strong incentive to practice Saint-Gobain's improved, commercially successful scintillator and therefore cross-license Saint-Gobain's patent so that both companies could have marketed the improvement to the benefit of the public. However, as this case study demonstrates, this theory is not what happened in practice. Instead of brokering a cross-license, Siemens sought to exclude the Saint-Gobain product from the market through an infringement suit seeking damages and immediate injunction relief.<sup>259</sup> It is likely the parties could not come to terms on a cross-license, or perhaps Siemens found that it was more profitable to exclude its competitor's improvement from the market altogether, rather than allow for both parties to compete in marketing the improvement. Such details are unavailable on the public record. The result, however, was that there was no cross-license facilitated by the blocking patents phenomenon. Or, if there was a cross-license brokered as part of a settlement following the Federal Circuit proceedings, it came only after lengthy, expensive infringement litigation that bled resources from the courts and from the parties. The blocking patents doctrine therefore failed to facilitate the efficient commercialization of Saint-Gobain's innovative new scintillator, much to the detriment of the public.<sup>260</sup> It was far more efficient for the Federal Circuit to decide the question by declaring that nonobvious, nonliterally infringing improvements over a claimed invention cannot infringe that patent under the doctrine of equivalents.

Moreover, the blocking patents doctrine does nothing to release separately patented innovations from the thicket of earlier patent claims when those earlier patents are owned by nonpracticing entities. Nonpracticing entities have no incentive to cross-license improvement patents because they produce no commercial products themselves. And the majority of infringement litigation in this country is brought by nonpracticing entities.<sup>261</sup>

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259. *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, No. 07-190-SLR, 2008 WL 114361, at \*1 (D. Del. Jan. 8, 2008) (order denying preliminary injunction).

260. Mark Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1010 (2008) ("Unless the parties bargain, no one gets the benefit of the improvement.").

261. Feldman, Ewing & Jeruss, *supra* note 9, at 13 (estimating that patent trolls filed 58.7% of the patent infringement lawsuits in 2012, and observing that trolls frequently target start-up companies in the internet and technology sectors) (citing John R. Allison et al., *Patent Litigation and the Internet*, 2012 STAN. TECH. L. REV. 3, 4 (2012)).

The solution to these concerns was easily within the grasp of the Federal Circuit. The court could have ruled that accused products cannot equivalently infringe patents over which they are patently distinct.

Hence, protecting unclaimed consideration from claimed inventions does not necessarily require radical changes to our patent laws that are unlikely to be implemented. Rather, it may require nothing more than modest changes in judicial philosophy in approaching close cases and questions of first impression. In developing the law through judicial precedent, judges should lean on the side of protecting and fostering the unclaimed consideration that society receives in exchange for the patent grant, rather than blindly strengthening the reach of claimed inventions, the majority of which are never developed into an innovation for the benefit of the public. Policing the doctrine of equivalents is but one example. Reforms to the reverse doctrine of equivalents, patent exhaustion, and other doctrines could also benefit from this perspective in judicial philosophy.

#### IV. CONCLUSION

In formulating patent policy, due attention should be paid to the benefit society receives in the form of unclaimed consideration as a quid pro quo in the patentee's social contract. Patent reforms and judicial decisions should give sufficient breathing room to this unclaimed consideration, which modern theories of patent law increasingly recognize as the primary value society receives in return for the patent grant. However, we need not propose radical reforms to the nature of our patent laws because these are unlikely to achieve consensus and could have unforeseen consequences for the innovation ecosystem. Rather, in close cases and cases of first impression, judges should lean on the side of protecting unclaimed consideration from the thicket of patent claims that threatens it.