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PATENTS IN ACTION

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ABSTRACT: In this paper, I consider the construction of patents as social practices. The goal is to observe patents in action, that is, to catch patents in the act of becoming patents. This method of “following the action” is well established in the sociology of science. Similar consideration of the artifices by which a new patent is staged reveals parallels to the known staging of technical papers, including the recruitment of rhetorical allies, semantic fortification against subsequent challenges, and trials of cognitive strength. In each situation, assertions become stabilized facts only if subsequent recipients are induced to accept them as such. However, the patent is formed in a process that largely sidesteps the mechanisms of peer review and material experimentation, substituting instead legal and procedural affordances to facilitate closure. Thus, following the action from which the stabilized patent is fabricated reveals the patent as a uniquely legal, rather than technical, social object.

CITATION: Dan L. Burk, *Patents in Action*, 63 JURIMETRICS J. 221–61 (2023).

We study science *in action* and not ready made science or technology; to do so, we either arrive before the facts and machines are blackboxed or we follow the controversies that reopen them.

—Bruno Latour¹

Patent scholarship routinely takes patents and the patent system to task for failing to achieve their expected purposes. The standard motif for such jeremiads is to assert a conventional policy justification for patenting—typically either

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1. BRUNO LATOUR, SCIENCE IN ACTION: HOW TO FOLLOW SCIENTISTS AND ENGINEERS THROUGH SOCIETY 258 (1988).

incentive theory or disclosure theory, or some combination of the two²—and then begin hyperventilating over some doctrine or practice that does not appear to fit the stated policy paradigm.³ Such critiques are not necessarily wrong on their own terms; it is clear that there are in fact many aspects of patenting practice that fail to further either incentives to invest in, or incentives to disclose the substance of innovative technology.

But a growing body of evidence indicates that we do not know enough about the actual role played by patents to speculate about whether they are successful in filling that role.⁴ Arguing over whether patents as presently constituted are adequate technical disclosures, or are a net benefit in promoting innovation is, to borrow Bruno Latour’s felicitous phrasing, rather like having a heated and detailed debate over the aerodynamics of the god Hermes’ flight—deliberating over how he can possibly stay upright using those tiny wings on his ankles, when there is in fact no reason to accept that such a being exists and is flying about in the first place.⁵

Here I propose taking a different tack, adopting the position that the unruly practices found in patenting are not departures from the normal and proper role performed by patents, but are instead evidence that the imagined scholarly paradigm of patent usage is entirely out of step with the way that patents are actually performing in the world. Rather than holding patent practice to an imaginary standard, we would do well to determine the actual practice—which is to say determine what social role patents are actually filling—before becoming distraught about whether patents are failing an idealized expectation.

In this Article, I suggest as I have in the past, that patents and patenting may be better viewed as the public manifestations of social practices related to innovation.⁶ The question is not so much what patents should do, as it is what they actually do; not what role we hope or wish they should play in technical innovation, but what patent structure and practice reveals about underlying innovative practices themselves. I will argue that no matter what purpose patents may be serving, they must necessarily first constitute *social objects*. Only after acceptance as discrete and coherent entities can they become the subjects of pos-

2. See Christopher A. Cotropia, *Physicalism and Patent Theory*, 69 VAND. L. REV. 1543 (2016) (characterizing “incentive theory” and “disclosure theory” as the two major justifications for the patent system).

3. Examples of such commentary abound, but some interesting specimens may be found in Sean B. Seymore, *The Research Patent*, 74 VAND. L. REV. 143 (2021); Janet Freilich, *Ignoring Information Quality*, 89 FORDHAM L. REV. 2114 (2021); Amy Motomura, *Innovation and Own Prior Art*, 72 HASTINGS L.J. 565 (2021); Janet Freilich & Lisa Larrimore Ouellette, *Science Fiction: Fictitious Experiments in Patents*, 364 SCI. 1036 (2019); Mark A. Lemley, *Ready for Patenting*, 96 BYU L. REV. 1171 (2016); Sean B. Seymore, *Making Patents Useful*, 98 MINN. L. REV. 1046 (2014).

4. Mark A. Lemley, *The Surprising Resilience of the Patent System*, 95 TEXAS L. REV. 1 (2016) (observing that empirical behavior of patent owners and applicants does not comport with expectations under incentive theory).

5. LATOUR, *supra* note 1, at 185.

6. See, e.g., Dan L. Burk, *Calculative Patents*, 99 TEXAS L. REV. ONLINE 183 (2021) [hereinafter Burk, *Calculative Patents*]; Dan L. Burk, *On the Sociology of Patenting*, 101 MINN. L. REV. 421 (2016) [hereinafter Burk, *Sociology*].

session, contestation, exchange, enforcement, or any other practice. And I will be less concerned with fixing the patent system, or conforming it to a stated policy, as with comprehending the social role it in fact appears to be playing.

Nonetheless, the heated and detailed patent critiques that I have mentioned, which are concerned with patents' imagined failures, will be highly useful to us in advancing our understanding of the role actually played by patents. First, these critiques (perhaps unintentionally) identify a gap between the real and imagined uses of patents, showing us where to focus our attention. If patents are not behaving as we expect them to, then that suggests we want to look carefully at how they are in fact behaving. Second and relatedly, such critiques help us to define the methods that we will *not* use in this study. Rather than assuming a purpose for patents and then complaining that they do not seem fit for such purpose, we will reverse this, taking a hard look at patents to identify the purposes for which they *do* seem fit. Once we know that, we can decide whether we like such purposes or not.

Thus, we will not be asking whether patents are behaving themselves well or poorly. The subject of inquiry here is rather different: how do patents become accepted as social artifacts, that are adopted as coherent legal objects, that can be the subject of social practice, whether that is licensing, investment, acquisition, litigation, post-grant reexamination, or something else?⁷ Our method will be to *follow patents in action*, which is to say to follow the process of enrolling the allies and resources that result in coherent social objects.⁸ We hope to catch patents in the act of becoming patents. We know that patents do not appear spontaneously; they do not begin as patents, but as contested assertions about the legal and technical status of particular technologies. Our goal is to arrive before the controversy is settled, before the patent package is neatly tied up and sealed, in order to see how it eventually came to be so.⁹ Our guide back through the settlement of such controversies is the patent itself, the product of "typified rhetorical action" that bears the indelible imprint of the social negotiations that produced it.¹⁰

This method of "following the action" is well established in the scientific arena, where the processes that lead from controversy to acceptance of stabilized

7. For example, I have suggested that patents are well positioned for deployment as boundary objects bridging disciplines. See Dan L. Burk, *Patent Silences*, 69 VAND. L. REV. 1603 (2016). Robin Feldman has argued that patents are best used to facilitate bargaining. See ROBIN FELDMAN, *RETHINKING PATENT LAW* (2012). Jason Rantanen and Sarah Jack have suggested that patents effectuate reputational interests. See Jason Rantanen & Sarah E. Jack, *Patents as Credentials*, 76 WASH. & LEE L. REV. 311 (2019). Kara Swanson has argued that patents are integral to defining the model democratic citizen. See Kara Swanson, *Beyond the Progress of the Useful Arts: The Inventor as Useful Citizen*, 60 HOUSTON L. REV. 363 (2022).

8. See Greg Myers, *From Discovery to Invention: The Writing and Rewriting of Two Patents*, 25 SOC. STUD. SCI. 57, 60, 99 (1995) (identifying enrolment of resources as the core process in stabilizing a patent).

9. Cf. LATOUR, *supra* note 1, at 258.

10. See Dan L. Burk & Jessica Reyman, *Patents as Genre: A Prospectus*, 26 LAW & LIT. 163, 178 (2014) (analyzing patents as a form of typified rhetorical action).

scientific facts has been extensively explored.¹¹ I suggest here that established frameworks for understanding scientific social practices may yield insights into the social practice of patenting. Given that patents share much of their form and language with technical literature, we might expect that patents also share many of the same mechanisms for semantic closure and stabilization.¹² Indeed, much of the scholarship critiquing current patent practice implicitly assumes that the patent functions as a form of technical document.¹³ We will see that this cannot be the whole story, but it is a useful starting place.

Instead, we will see that patents in action depart in significant respects from science in action. Patent formation employs its own decidedly nonscientific strategies for settling controversies and reaching closure. In particular, the patent is formed in a process that largely sidesteps the sociotechnical mechanisms of peer review and material experimentation, substituting instead a set of legal and procedural affordances intended to facilitate closure of controversies.¹⁴ Thus, following the action from which the stabilized patent is fabricated reveals the patent as a uniquely legal, rather than technical, social object.

In following the action in the patent system, we in essence adopt the old adage that actions speak louder than words. What matters is not what is said about patents, but what is done about them. Patent commentary may be full of assertions about the nature and purpose of patents: that they are an incentive to investment, that they trade disclosure for exclusivity, that they enrich the corpus of technical knowledge. Here we discount such rhetoric in the colloquial sense so as to focus on rhetoric in the technical sense.¹⁵ That is to say, we are not concerned with the conclusory statements that are made about patenting, we are rather concerned with the semantic practices of patenting. Thus, we ignore the rhetoric *about* patents while engaging with the rhetoric *of* patents.

11. See LATOUR, *supra* note 1.

12. See Myers, *supra* note 8, at 58 (noting similarities between scientific publications and patents); Cf. LATOUR, *supra* note 1, at 48 (“The transformation of linear prose into, so to speak, a folded array of successive defence lines is the surest sign that a text has become scientific.”).

13. See, e.g., Freilich, *supra* note 3; Colleen V. Chien, *Opening the Patent System: Diffusionary Levers in Patent Law*, 89 S. CAL. L. REV. 4 (2016); Lisa Larrimore Ouellette, Pierson, Peer Review, and Patent Law, 69 VAND. L. REV. 1825 (2016); Kevin E. Collins, *The Structural Implications of Inventors' Disclosure Obligations*, 69 VAND. L. REV. 1785 (2016); Timothy R. Holbrook, *Patents, Presumptions, and Public Notice*, 86 IND. L.J. 779 (2011); Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621 (2010); Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539 (2009).

14. Perhaps not surprisingly, some commentators focusing on technical disclosure have advocated incorporation of peer review into patent examination. See Ouellette, *supra* note 13.

15. See Burk, *supra* note 7, at 1605 (“Much of my focus here will be on the use of language, on what is properly called rhetoric, not in the pejorative sense of empty or effusive oratory, but rather in the formal sense of an analysis probing the social or epistemological content of discourse.”).

I. CRITIQUING PATENTS

We therefore begin with the grievances that I have noted are routinely leveled against the patent system. Numerous complaints have been raised regarding the operation of the patent system (and probably many more should be raised) but we will be primarily concerned with two pervasive sets of critiques in the present literature. A first, common complaint about the current character of patents and the patent system concerns the ambiguity of textual patent claiming. The imprecision of claim language has been said to create uncertainty that impedes the incentive function of patents.¹⁶ A second, seemingly unrelated body of scholarship is concerned with apparent defects in the disclosures conveyed by patents. Patents are said to lack technical details, or to adopt linguistic conventions that make it difficult to parse the meaning of the technical information disclosed in the document. Such disclosure gaps are said to frustrate the “teaching function” of patents.¹⁷

Although these two sets of concerns may seem to address different problems, they are in fact closely related to one another in a number of aspects, notably the focus on the textuality of patents: the text of patent claims is said to be intolerably ambiguous, and the text of the patent specification is likewise said to be intolerably ambiguous. The first type of textual ambiguity fails to give notice of the patent’s legal scope; the second fails to communicate the patent’s technical scope. To the degree that legal scope is related to technical scope, the two complaints converge.

We will shortly see that these are complaints barking up the wrong trees, and perhaps yammering in the wrong forest altogether. But they flag, perhaps inadvertently, a crucial characteristic of patents and patent practice, which is that patents are entirely intertextual.¹⁸ The substance of the patent is fabricated from the interaction of multiple texts: that of the patent application or published patent itself; the prior art documents; the epistolary give and take of the prosecution history; the texts of Patent Office regulations, federal statutes, and judicial opinions.¹⁹ Thus the construction of qualities associated with patents is dependent upon rhetorical or semantic consistency, and not necessarily upon alliances with scientific or technical material practices.²⁰ This becomes most

16. JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS AND LAWYERS PUT INNOVATION AT RISK* 46 (2009).

17. See *supra* note 13 and sources therein.

18. See Burk & Reyman, *supra* note 10, at 171.

19. I will be focusing here on the textual practices found in the United States Patent Office (USPTO). For parallel observations regarding the deployment of examination guidelines in the European Patent Office (EPO), see Siva Thambisetty, *The Construction of Legitimacy in European Patent Law*, 3 INT. PROP. Q. 227 (2017).

20. *Contra* Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381, 383 (2005) (“In patent law, for example, there is the actual device that the inventor developed, and there is the legally distinct thing that the patentee owns, which the law knows as the patent claim.”). Unfortunately, in patent law there is, as the saying goes, no spoon. *Cf.* Yochai Benkler, *There Is No Spoon*, in *THE STATE OF PLAY: LAW, GAMES, AND VIRTUAL WORLDS* 180, 180 (Jack M. Balkin & Beth Simone Noveck eds., 2006) (quoting the *bon mot* on materiality

apparent in the practice of filing “paper patents,” that is, patents on imagined inventions that have never actually been built or materially practiced.²¹ If described in sufficient textual detail, such inventions are considered to be “constructively reduced to practice” and may be awarded a patent without having ever been actually tested.²²

Taking this practice a step further, it is entirely permissible to enable an invention by offering the Patent Office “prophetic examples” that describe hypothetical, speculative instantiations of the claimed invention and predict or prophesy the results the applicant would expect to observe if the experiment or test were actually conducted.²³ Such hypotheticals are not couched in hypothetical terms, however, but are instead described in the text as if the test had been physically performed.²⁴ The only indicator that the prophetic example is not an actual example is a change of tense: prophetic examples are described in the present tense, whereas examples actually built or practiced must be described in the past tense.²⁵ Somewhat bizarrely, using the past tense for a prophetic example may constitute sanctionable fraud on the Patent Office, since it indicates that tests were done when in fact they were not.²⁶ Such practices have been lamented by critics of patent disclosure,²⁷ but we will see that they are emblematic of the action we have set ourselves to follow.

II. PATENTS AS PROPERTY

From the two sets of critiques identified above, we begin with complaints regarding patent claims and property rights. Patents are frequently characterized as a species of property, meaning that they entail the right to exclude.²⁸ Certain previous commentators on the use of patents have been at some pains to insist that in order to function as a set of “property” rights, patent claims must be unambiguous and certain, asserting that “[i]f [y]ou [c]an’t [t]ell the [b]oundaries, [i]t [a]in’t [p]roperty.”²⁹ Ambiguity or uncertainty in patent claims are thus said

and perception from the movie *The Matrix*). Professor Madison’s patent example is an unfortunate deviation from his generally useful point, underscoring my discussion here, that the law has difficulty in comprehending artifacts that are not semantically reified before being legally reified. See Madison, *supra*, at 384–85.

21. See John F. Duffy, *Reviving the Paper Patent Doctrine*, 98 CORNELL L. REV. 1359, 1360–61 (2013) (summarizing the history and usage of the term *paper patent*).

22. *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 926 (Fed. Cir. 2004).

23. *In re Strahilevitz*, 668 F.2d 1229 (C.C.P.A. 1982).

24. UNITED STATES PATENT OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 608.01(p) (9th ed. 2015).

25. *Id.*

26. *Novo Nordisk Pharm., Inc. v. Bio-Tech. Gen. Corp.*, 424 F.3d 1347, 1359–60 (Fed. Cir. 2005); *Hoffmann-La Roche, Inc. v. Promega Corp.*, 323 F.3d 1354, 1363–64 (Fed. Cir. 2003).

27. See Freilich & Ouellette, *supra* note 3; Janet Freilich, *Prophetic Patents*, 53 U.C. DAVIS L. REV. 663 (2019).

28. See, e.g., Frank Easterbrook, *Intellectual Property Is Still Property*, 13 HARV. J.L. & PUB. POL’Y 108 (1990). However, the Supreme Court has recently cast this characterization into some doubt by labeling patents a “public franchise.” *Oil States Energy Services, LLC v. Greene’s Energy Group, LLC*, 584 U.S. __; 138 S. Ct. 1346, 1373–74 (2018).

29. BESSEN & MEURER, *supra* note 16, at 46.

to constitute a failure of the patent system that will lead to the fatal impairment of patents as incentives to innovation.

But this assertion cannot be correct as stated. On its face, this trope would entirely preclude patents from ever constituting “property” because no textual description ever entails liminal certainty.³⁰ Other legal texts, such as contracts, are well understood to remain incomplete, and properly so—the costs of attempting to define the boundary become incrementally greater than the certainty provided.³¹ To the contrary, the boundaries of contractual rights and promises, such as the meaning of the term *chicken* in a commodities contract, may be ambiguous or indefinite, subject to disagreement, requiring litigation to resolve.³² But this in no way deters the routine deployment and use of contracts, or the vigorous exchange of options and futures contracts in the marketplace.

Historically, patents themselves eschewed linguistic boundaries, and instead followed a system of “central claiming” that left the boundaries of the claim intentionally ambiguous; the inventor was expected to describe in the patent her specific embodiment, and courts would add to that a fair range of protection after the fact.³³ The imposition of the current “peripheral claiming” practice, which attempts to describe the outermost limit of the patent claim, is a more recent (and problematic) development that nonetheless retains distinct linguistic features of the earlier open central claiming regime.³⁴ Other forms of intellectual property, that undoubtedly constitute property, still follow central definitional practices that patent law has moved away from.³⁵ Thus, the requirement of liminal certainty would have excluded patents of the nineteenth century from constituting property, and would exclude most forms of intellectual property today from constituting property. This casts the blithe equation of boundary and property into doubt.³⁶

In the case of tangible property in the form of chattels or real estate, we are accustomed to an illusion of definiteness because of the physical boundaries or

30. See Timothy Endicott, *The Value of Vagueness*, in VAGUENESS IN NORMATIVE TEXTS 27 (Vijay K. Bhatia et al. eds., 2005) (showing that precision in legal texts is generally impossible and frequently counterproductive).

31. See Eric Posner et al., *The Design and Interpretation of Contracts: Why Complexity Matters*, 95 NW. U. L. REV. 91 (2000) (discussing transaction cost deterrents to drafting complex contracts); see also Sarath Sanga, *Incomplete Contracts: An Empirical Approach*, 34 J.L. ECON. & ORG. 650 (2018) (exploring evidence for contracts deliberately left incomplete).

32. See *Frigalimint Importing Co. Ltd. v. BNS Int’l Sales Corp.*, 190 F. Supp 116 (S.D.N.Y. 1960) (determining the intended meaning of the term *chicken* in a commercial contract).

33. See *Hilton Davis Chemical Co. v. Warner-Jenkinson Company, Inc.*, 62 F.3d 1512, 1565 (Fed. Cir. 1995) (Nies, J., dissenting) (explaining the historical distinction between central and peripheral claiming).

34. Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743 (2009); cf. Myers, *supra* note 8, at 73 (asserting that academic writing provides “signposts” whereas patents “stake out boundaries.”).

35. Burk & Lemley, *supra* note 34 at 1746–47; Jeanne Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719 (2009).

36. Cf. Michael Spence & Timothy Endicott, *Vagueness in the Scope of Copyright*, 121 L.Q. REV. 657, 657 (2005) (questioning the suitability of analogies to real property boundaries in copyright law).

edges associated with the item. These often coincide with the legal boundaries associated with the object, although not necessarily. But it is well understood that even such apparently bounded physical objects bear with them a panoply of unseen and intangible characteristics, so that what is traded is a bundle of seen and unseen attributes. In some cases, these are formal legal characteristics, such as warranties, easements, or encumbrances.³⁷ In other cases, the object is surrounded by a cloud of informal characteristics, such as norms, mores, customs, and folkways. In either case, the attachment of such invisible attributes is as important to the item as the observable attributes such as height, weight, color, speed, construction, or durability—indeed, the unseen attributes may be those that are most valued, affecting the price and desirability of the composite object.³⁸

Consequently, we must conclude that the “property as boundary” trope cannot have been meant as stated. But, rather than dismiss it entirely, we might interrogate the assertion to see what sense might be made of it. In this light, it is helpful to note that markets routinely deal in artifacts that have uncertain boundaries and fluctuating characteristics, so long as the parameters of such uncertainties are sufficiently well understood to allow calculation of risk. For example, firms have emerged that are in the business of monetizing and trading unsettled legal claims, despite the inherent uncertainty of successfully litigating any particular legal claim.³⁹

Thus, we might better take the assertion of “bounded property” as intended to offer a reflection upon uncertainty or risk—arguing that where the parameters of property are uncertain, the risk created will deter investment. But this can only be the case for risk of a *certain type*; other types of risk are acceptable and customary features of business transactions, and indeed may be desirable features of business transactions. High risk promises high reward; navigating risk is a method of increasing profits. Investors routinely develop and deploy a variety of stratagems for risk hedging. Indeed, where patents are concerned, a number of commentators have observed that patents are seldom acquired individually, but rather in portfolios—a classic strategy to hedge risks.⁴⁰ But risks taken in deploying a patent are a different matter than those arising from a risky patent.⁴¹

37. Dan L. Burk, *Muddy Rules for Cyberspace*, 21 CARDOZO L. REV. 121, 124 (1999).

38. Burk, *Calculative Patents*, *supra* note 6, at 200.

39. See Lee Drucker, *A Financial Perspective on Commercial Litigation Finance*, 12 N.Y.U. J.L. & BUS. 665 (2016).

40. See Gideon Parchomovsky & R. Polk Wagner, *Patent Portfolios*, 154 U. PA. L. REV. 1 (2005).

41. This observation is closely related to the distinction sometimes drawn between risk and uncertainty, the former defined as a potentiality in which the probability distribution is known but the outcome is not, and the latter defined as a potentiality for which neither the probability distribution nor the outcome is known. See FRANK KNIGHT, *RISK, UNCERTAINTY, AND PROFIT* 19–20, 231–32 (1921). Professor Bray has argued that either type of indeterminacy is detrimental to the economic justifications usually advanced for property entitlements. Samuel L. Bray, *Preventive Adjudication*, 77 U. CHI. L. REV. 1275, 1309–13 (2010).

This is inherent in the real property analogy. Like everything in life, real property is itself subject to some degree of uncertainty; a plot or parcel may have been erroneously surveyed or the chain of title may be defective (a problem addressed by the market in title insurance). In general, the physical limits of the property do not change appreciably, although this can sometimes occur through processes of accretion or erosion. Recognition of practices such as adverse possession, easement, encroachment, and condemnation can alter dimensions of the property's exclusivity. But overall, despite some chance of alterations in the landscape, some possibility of defective definitional boundaries, and routine legal incursions on the exclusivity of those boundaries, real property is held up as the paradigm for stable and coherent entitlement deployed for investment, use, or transfer.⁴²

We might therefore say that the assertion that “if you can't tell the boundaries, it ain't property” points toward a kernel of truth, even if the assertion as framed cannot be entirely correct. As we shall repeatedly see during our illumination of the social role assumed by patents, the role to be filled by the patent requires a type of certainty, but it is certainty in the sense of *closure* or *discursive repose* rather than an elusive and theoretical exactitude. Specifically, regardless of the precision of its boundaries, the success or failure of the social artifact labeled a “patent” depends on whether it can be *treated as a coherent and cohesive whole*, or whether it remains the subject of unresolved fragmentation or controversy. Ideally, the patent would be free of associated complexities and controversies so that it becomes routine, dependable, and unproblematic.⁴³ The better formulation of the “boundary” trope might be to say that the patent as a social object must be *sufficiently stable* to constitute an object of exchange.⁴⁴

Such transformation of innovative claims into a coherent and stable social object is no trivial feat. Each innovation comes into the world trailing an unruly entourage of companions, adjuncts, and collaborators—unacknowledged contributors, unfinished lines of research, unrealized or unperfected embodiments, dubious uses or applications, alternative claimants. The tangle of loose ends is not simply a drag on the future trajectory of the innovation, but constitutes a battery of ontological shear forces tugging and pulling the innovation in different directions, threatening to unravel it. There must therefore be some mechanism for taming this disorderly crowd of hangers-on, bringing them into line, hiding them from view, dispersing them to other pursuits.

We will ask then: how are patents, as coherent social entities, born? Any first-year patent law firm associate can surely recite the list of public and private institutions, the mechanical procedural steps, and the rote legal standards that are ostensibly required for formal issue of a patent. But compliance with the ritual formalities of black-letter law do not necessarily result in concomitantly

42. See Madison, *supra* note 20, at 418 (“Cognitively, there is a related universality and finality that appears to attach to [legal] definitions of [natural] things.”).

43. Cf. LATOUR, *supra* note 1, at 43 (describing how stabilized facts become so routine as to disappear).

44. See Thambisetty, *supra* note 19, at 229 (arguing that patent claims are stabilized by chains of antecedent referents).

anticipated social compliance. The motorists who fly down the freeway at 90 miles per hour are generally well aware of the posted speed limit of 65 miles an hour, as well as the associated enforcement apparatus of radar guns, patrol vehicles, traffic courts, fines, and speeding tickets. They simply choose to ignore the law and its associated mechanisms.

This same indifference to the dictates of the law occurs sometimes with patents as well, where we have evidence that the exclusivity and associated enforcement mechanisms may be entirely ignored by those working within the patent's ambit.⁴⁵ But where patents are accepted and incorporated into innovative practice, some set of social mechanisms besides or in addition to formal legal recognition has facilitated this action. Something more is surely needed to convince investors, entrepreneurs, and manufacturers to buy into the legal and social fiction that something called a "patent" is the legitimate object of purchase, sale, license, trade, respect, imitation, and sometimes circumvention in business practice.⁴⁶ The need for something more than a formality seems particularly urgent when the object in question is purely textual and conceptual, with no material tangibility that would lend itself to routine examination and apprehension.

Law is of course no stranger to this concept of closure, and legal processes routinely incorporate concepts of repose, recognizing that there is a tradeoff between accuracy and finality, and at some point, the latter becomes paramount.⁴⁷ Property law has long included concepts of "quiet title" by which entitlements claims, even meritorious entitlements claims, may be extinguished in favor of certitude. In other circumstances, statutes of limitations, default, waiver, estoppel, laches, and a host of other doctrines extinguish further controversies or claims against legal entitlement, elevating the value of certainty over the potential for additional pertinent information.⁴⁸ Not every evidentiary claim will be fully vetted; not every fact will be fully considered.⁴⁹

Here it is crucial to exercise some caution. Legal concepts such as quiet title are illustrative, but not determinative. The type of closure we are investigating is quintessentially rhetorical and social rather than legal. Although legal practice will contribute to the coherence of the patent, reification as an object of exchange is not necessarily, and not primarily, the extinction of legal claims or controversies. For example, the ownership or disposition of a patent may be disputed even after rhetorical closure. Legal contestation may still accompany a

45. See Mark A. Lemley, *Ignoring Patents*, 2009 MICH. ST. L. REV. 19.

46. See Thambisetty, *supra* note 19, at 240 (noting the role of patent examination in establishing patent legitimacy for multiple constituencies).

47. See Jeffrey Boles, *Easing the Tension Between Statutes of Limitations and the Continuing Offense Doctrine*, 7 NW. J.L. & SOC. POL'Y 219 224–25 (2012) (summarizing the value of repose in statutes of limitation); Tyler T. Ochoa & Andrew Wistrich, *The Puzzling Purposes of Statutes of Limitation*, 28 PAC. L.J. 453, 466–68 (1997). (exploring considerations of certainty in legal repose).

48. See Oliver Wendell Holmes, *The Path of the Law*, 10 HARV. L. REV. 457, 476–77 (1897) (arguing the primacy of settled expectations in legal resolution); see also RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 587 (4th ed. 1992) (suggesting statutes of limitations moderate accuracy and certainty).

49. See GORDON TULLUCK, *TRIALS ON TRIAL: THE PURE THEORY OF LEGAL PROCEDURE* 153–55 (1980) (discussing the social cost of overinvesting in evidence).

coherent settled patent, but the coherence of the patent precedes legal conflicts—else there would be nothing to legally contest. We will see that certain legal mechanisms support and facilitate the closure of patent controversies, but legal and social closure remain separate though related questions.

III. PATENTS AND TECHNICAL DISCLOSURE

This brings us to the second school of criticism that I have mentioned above, which takes the patent system to task for its failure to provide sufficient disclosure of technical details. Critiques of this sort rest to a greater or lesser degree on the misguided assumption that patents are technical documents. Certainly, patents are easily mistaken for technical documents; they employ the vocabulary and terminology of science or engineering; they cite scientific journals and other technical documents; they are handled by a corps of examiners and by practitioners who are required to have completed training in a technical field.⁵⁰ Legislative reports and judicial opinions tout the patent as a source of technical information to the technical community, and these (rather naïve) articulations of purpose have become the basis for extended academic commentary on the success or failure of patents as technical disclosures. Even when the efficacy of the patent as a technical document is disputed, as it has been by numerous commentators, the underlying rationale of technical disclosure is rarely contested.⁵¹

However, the form of the patent document is, as I have hinted above, deceptive.⁵² The patent is a legal document written in technical language, which is why it might be taken to constitute a technical document. It is not. We will shortly consider in detail the vast array of allies and supporters that are recruited to support the patent document, but it is clear these are not marshalled to reach closure on scientific facts or phenomena, but rather to reach closure on a legal artifact: the claimed invention, and ultimately on the scope of rights that attaches to the claimed invention. That the invention associated with the claims meets the statutory requirements such as utility and enablement means that the text defines a juridical entity encompassing those characteristics. These characteristics are themselves wholly textual, conceptual requirements.⁵³

To be sure, these legal requirements may be associated with scientific or technical characteristics at one remove; if the invention described in the text of the patent cannot be made to physically operate—assuming that anyone ever actually tries to physically practice the claimed invention—then the description fails the required quality of utility, and the sociolegal structure of the patent collapses.⁵⁴ But there is no requirement that the patent applicant prove or even

50. Burk & Reyman, *supra* note 10, at 172.

51. Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 745 (2012); Douglas Lichtman, *How the Law Responds to Self-Help*, 1 J.L. ECON. & POL'Y 215, 255 (2005).

52. See *supra* note 12 and accompanying text.

53. See *Hoffmann-La Roche, Inc. v. Promega Corp.*, 323 F.3d 1354, 1377 (Fed. Cir. 2003) (Newman, J., dissenting) (“Unlike the rules for scientific publications, which require actual performance of every experimental detail, patent law and practice are directed to teaching the invention so that it can be practiced.”).

54. *In re Kirk*, 376 F.3d 936, 942 (C.C.P.A. 1967).

test this quality in advance—she may file a “paper patent” that is sufficiently rhetorically convincing to obtain exclusive rights, and if her described utility holds up to later testing (or more likely, is never tested at all) those rights will endure.⁵⁵

The assertion is sometimes made that practitioners in the technosciences can, and sometimes do, glean technical information from the corpus of published patents.⁵⁶ This is likely true, but not particularly salient to the trajectory of patents in action. Can researchers in the family sciences or in criminology glean information about family life or about criminal behavior from published opinions of family or criminal courts? Undoubtedly the answer is yes, with the caveat that judicial opinions are not constructed for that purpose. The information about families or about social deviance scraped from such opinions will be limited and skewed by a host of considerations, including the admissibility of evidence, prosecutorial or administrative discretion, considerations of procedure, and matters of judicial economy. Should we be concerned that the information in such opinions is ill-suited to social science, or demand that the opinions include details more useful to social research? The ability of researchers to similarly sometimes scrounge details from patents tells us little about patents in action.

The critical insight here is that the social practices, institutions, and structures surrounding the patent are not intended or fashioned to construct a physical or technical fact, but to construct a social and legal fact. This distinction is crucial, and we shall return to it repeatedly. Recall again that the patent is entirely intertextual; at no time is the inventor required to produce a physical object or process.⁵⁷ Instead, the applicant is required to convincingly describe such an object or process. Prior to issue, and oftentimes in proceedings after issue, the text is examined for rhetorical or conceptual gaps, but as we shall see in detail, it is not subjected to material experimental or observational verification. It is compared to other texts; it is not compared to experimental or observational trials.

IV. RECOGNIZING SOCIAL FACTS

Here it is useful for us to distinguish social facts from what we will call (at least for the moment) “natural” facts.⁵⁸ A classic example of the former is the piece of paper found in my wallet, adorned with a portrait of George Washington, that constitutes a “dollar.”⁵⁹ The value, indeed the existence, of the “dollar” is a fact, but this fact is based entirely upon agreement among humans. There is

55. See *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 926 (Fed. Cir. 2004).

56. See, e.g., Lisa Larrimore Ouellette, *Who Reads Patents?*, 35 *NATURE BIOTECHNOLOGY* 421 (2017); Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 *HARV. J.L. & TECH.* 531 (2012).

57. See *supra* notes 18–22 and accompanying text.

58. See Emile Durkheim, *What Is a Social Fact?*, in *THE RULES OF SOCIOLOGICAL METHOD AND SELECTED TEXTS ON SOCIOLOGY AND ITS METHOD* 50, 59 (Steven Lukes ed., W.D. Halls trans., 1982) (defining social facts).

59. JOHN R. SEARLE, *THE CONSTRUCTION OF SOCIAL REALITY* 189 (1995).

in the universe no naturally occurring object constituting a “dollar.” In contrast, independent of human agreement, there does exist in the universe a physical material we have dubbed “selenium” that has particular chemical properties, such as an atomic number of 34, an average atomic weight of 98.971, a melting point of 494° K, a specific gravity of 4.81 g/cc, and so on.⁶⁰ We expect that selenium would exist, and would display such properties, whether or not humans know or care about it.

Note that these designations are primarily differences in degree rather than differences in kind. The facts that we associate with nature rather than with society are deeply imbedded and intertwined with social meanings, constructions, and functions. The metrics with which I describe selenium, and the units associated with those metrics, are human conventions, as is the conviction that the characteristics I described are pertinent to characterizing selenium. For that matter, distinguishing selenium from the rest of the material universe is itself a convention of human classification and understanding. We view such facts as existing independently of us, but we never apprehend them free from social construction—a point to which we will return in the next section.

For now, armed with these distinctions, we can begin to get a sense of the types of facts that are entailed in the construction of a patent. It should be quickly recognized that the intertextual patent we have been describing is itself as a whole a social fact. The entity we term a “patent” is manifestly the result of social agreement. We have agreed to recognize legal exclusivity with regard to technology described in a document that has a particular administrative origin, and that bears a particular date, number, and other identifying markings. Neither the document nor its social treatment constitutes anything but a social fact.

But we may also draw distinctions among the “facts” used to support the construction of a particular patent so as to determine which (if any) natural facts the patent is based upon. For example, consider the following assertions:

- (1) “The claimed invention is nonobvious over the prior art.”
- (2) “The patent term runs from the filing date of April 22, 2018.”
- (3) “The claimed invention is a method for treating Alzheimer’s disease by administering a cognitively-enhancing dose of galanthamine.”

The first of these is a legal conclusion, and while it may constitute a truth as asserted before the Patent Office, or as determined by the rulings of a court, it is an entirely socially constructed truth. Nonobviousness is a quality required of inventions in order to obtain a valid patent,⁶¹ but it is an agreed-upon quality. No such characteristic as nonobviousness exists in the universe apart from human fabrication and labeling. The meaning and parameters that we assign to

60. N.N. GREENWOOD & A. EARNSHAW, *CHEMISTRY OF THE ELEMENTS* 753 (2d ed. 1997) (describing the physical properties of selenium).

61. 35 U.S.C. § 103.

nonobviousness are those we create, we can change them if we choose, and indeed both the courts and Congress periodically do so.⁶²

Indeed, although the Supreme Court has told us that nonobviousness is a conclusion of law based upon findings of fact,⁶³ the “facts” on which nonobviousness is based are themselves largely or wholly socially fabricated. Statement number one, for example, refers to the “prior art,” and according to the Supreme Court, determining the scope and content of the prior art is a factual inquiry on which nonobviousness relies.⁶⁴ But the class of references constituting the prior art is constructed by convention—current law requires the references to be patents, printed publications, sales, public uses, or other information available to the public;⁶⁵ they must be dated before the patent claiming the invention was filed,⁶⁶ and they must either relate to the field of the invention or to the question the inventor was trying to solve.⁶⁷ None of these requirements constitutes what we have called “natural” facts. For example, determining the “field” of the invention and the question the inventor was pursuing proves to be entirely an exercise in legal construction.⁶⁸

Statement number two seems at first reading to lie closer to a statement of natural fact. We understand that the patent term is a legally created concept; presently the patent term runs for 20 years,⁶⁹ although at other times it has run for 17 or even 14 years.⁷⁰ But once we know how long it runs, it seems an objective and empirical matter to count to 20 or 17 or whatever the designated number may be. Similarly, the statute provides that patent terms, whatever they are, run from the filing date.⁷¹ This is again a legally created convention; in the past, patent terms have sometimes run from the date that the patent issued.⁷² But once we know what the legal convention is, we can calculate the term with some sense of empirical determination.

This certainty about the factuality of the patent term is somewhat deceptive, and undoubtedly a bit naïve. For example, the statute makes reference to the patent application’s date of “effective” filing, which is a suspiciously lawyerly term that should give us pause.⁷³ It turns out that under some circumstances, dictated by statute and by treaty, the relevant date of filing may begin to run

62. *See, e.g.*, *Graham v. John Deere Co.*, 383 U.S. 1, 3–4 (1966) (considering whether Congressional enactment of a statutory nonobviousness requirement was intended to codify judicially created concepts of nonobviousness).

63. *Id.* at 17.

64. *Id.*

65. 35 U.S.C. § 102.

66. *Id.*

67. *In re Clay*, 966 F.2d 656, 658–59 (Fed. Cir. 1992).

68. *See* Brenda M. Simon, *Rules, Standards, and the Reality of Obviousness*, 65 CASE W. RESRV. L. REV. 25, 35–37 (2014).

69. 35 U.S.C. § 154(a)(2).

70. Mark A. Lemley, *An Empirical Study of the Twenty-Year Patent Term*, 22 AIPLA Q.J. 369, 372 (1994).

71. 35 U.S.C. § 154(a)(2).

72. *See* Lemley, *supra* note 70, at 370.

73. *See, e.g.*, 35 U.S.C. § 102 (a)(1), (b)(1).

from receipt of the application in the United States Patent Office, or alternatively it may begin to run upon receipt in the patent office of some other country.⁷⁴ There are also situations where all or part of the information in the patent document may relate back, not to the filing date of the document we are looking at, but to the filing date of some earlier document.⁷⁵ So at a minimum, we must pay attention to some legal circumlocutions in order to know when to begin counting the supposedly definite patent term.

And of course, with a bit of prodding, even the seemingly stable natural fact of the date itself will quickly become unraveled. The term begins at a specified point in time, and lasts for a certain duration, but how we recognize those temporal characteristics is, again, entirely socially constructed.⁷⁶ The filing happened upon a certain date, but agreeing on the date will depend, for example, upon whether the calendar referenced is Gregorian or Julian or Hebrew or Hijri or something else. Specifying these parameters is a semantic and social exercise largely unconnected to the world; defining such time periods, as Jeremy Waldron points out, establishes “analytic connections between words and words, not between words and things.”⁷⁷

The third statement above is likely to be the most deceptive of all, and is key to understanding the nature of patent closure. On its face it seems to articulate, or at least to reference, a natural fact: it expresses a relationship between the qualities of a particular chemical structure, galanthamine, and their effect when applied to a particular physiological state, Alzheimer’s disease.⁷⁸ As with the specific gravity of selenium or the date from which a patent term runs, there are of course entanglements between the social and the physical: how we classify the substance we term galanthamine, how we diagnose or define the symptoms constituting Alzheimer’s disease, and so on. But behind such social trappings as are inevitably present, a method of changing the biochemistry of the brain with a particular chemical substance would seem to constitute a natural fact.

However, nothing could be further from the case. Statement three is not actually concerned with biochemical or curative properties of galanthamine, important as they may be to the internal logic of the text. Rather, the statement asserts that a method incorporating galanthamine to treat Alzheimer’s disease constitutes an *invention*. And although it is tempting to assume that the facticity of the assertion of invention depends on whether galanthamine is effective as a treatment for Alzheimer’s, it is not. The question to be answered in examining the application is not whether galanthamine can be used to treat Alzheimer’s, or even whether it is scientifically plausible to do so. The question is rather whether these assertions can meet the requirement of conceptual and rhetorical coher-

74. See 35 U.S.C. § 100 (i)(1).

75. See 35 U.S.C. § 120.

76. See Alain Pottage, *An Apocalyptic Patent*, 31 L. & CRITIQUE 239, 241, 244 (2020) (arguing that patents structure their own temporal logic).

77. Jeremy Waldron, *Vagueness in Law and Language: Some Philosophical Issues*, 82 CAL. L. REV. 509, 510 (1994).

78. Cf. *Janssen Pharmaceutica v. Teva Pharms. USA Inc.*, 583 F.3d 1317 (Fed. Cir. 2009) (concerning rejected claims to a method of treating Alzheimer’s disease with galanthamine).

ence needed to satisfy the legal standard. So what may at first have appeared to be a statement about natural facts turns out not to be such a statement at all.

V. CREATING NATURAL FACTS

At this point, the patent critic whose reproach of current practices launched us on our journey is likely to inform us (somewhat impatiently) that he is well aware the patent is a legal document, and he knows very well that the exclusive rights and other legal characteristics attached to the patent are legal, and hence social, conventions. But he also reminds us that the patent document is statutorily required to particularly point out and distinctly claim an invention, and that even if the “invention” is a legal concept, it is surely constituted from material entities outside the text of the patent document. Specifically, to take our example above, he says that there is a material substance called galanthamine, and it interacts in particular ways with another material substance called cholinesterase according to the established laws of chemistry. Those are natural facts. And the critic’s complaint is about the deficiency of patents in their disclosure of such natural facts: they are ambiguous, or incomplete, or even misleading in such disclosures.

To address such complaints—an exercise, which, happily, takes us a further step along our investigation of patents in action—we must now turn to consider the construction of natural facts, and we will see that they are perhaps not after all that different in many respects from social facts. Specifically, we want to identify the social mechanisms that bring a scientific assertion to a state of epistemic repose, quelling prior controversies and solidifying its acceptance as a fact. We find an array of both discrete and informal institutional mechanisms serve to move scientific assertions to a level of rhetorical closure.

The general understanding about natural, scientific facts is that they constitute solid, stable, dependable statements about the world. But, for any given scientific assertion, it was not always so. Behind every recognized, established scientific fact lies a history of contestation and dispute. Some contentious scientific concepts are discarded or abandoned, never reaching a point of firm acceptance. Others, such as phrenology,⁷⁹ N-rays,⁸⁰ and Lamarckism⁸¹ were at one time accepted as established scientific concepts, but have since been discarded and repudiated. Yet other scientific concepts such as “general relativity”⁸² or “the double helix”⁸³ or “proteinaceous infectious particles”⁸⁴ that were at one time rife with controversy, doubt, and contestation have become generally and

79. Oivi Parker-Jones et al., *An Empirical, 21st Century Evaluation of Phrenology*, 106 *CORTEX* 26 (2018).

80. Mary Jo Nye, *N-rays: An Episode in the History and Psychology of Science*, 11 *HIST. STUD. PHYS. SCI.* 125 (1980).

81. Conway Zirkle, *The Early History of the Idea of the Inheritance of Acquired Characters and of Pangenesis*, 35 *TRANS. AM. PHIL. SOC’Y.* 91 (1946).

82. ALBERT EINSTEIN, *RELATIVITY—THE SPECIAL AND GENERAL THEORY* (Robert W. Lawson trans., 1920).

83. JAMES D. WATSON, *THE DOUBLE HELIX: A PERSONAL ACCOUNT OF THE DISCOVERY OF THE STRUCTURE OF DNA* (1968).

84. Stanley B. Prusiner, *Prions*, 95 *PROC. NAT’L ACAD. SCI.* 13363 (1998).

firmly accepted, and indeed have become the subject of routine and almost casual agreement.

We want to know, then, how some such controversial assertions—but not others—came to be stable and dependable and almost unthinkingly accepted. We want to know how a scientific concept comes to be accepted as a “fact.” How are the uncertainties and controversies attending scientific arguments closed, resolved, and set aside so that the result is viewed as a coherent component for subsequent research? Why do some scientific propositions become so standard and so routine that references to them can be tossed off in everyday conversation or in the popular press?

The naïve answer is that such accepted scientific assertions are “the truth” and their acceptance occurs as a matter of unimpeachable empirical “proof” about nature. But as Latour points out, “nature” is never found directly behind any technical text.⁸⁵ It is at best lurking somewhere in the layers of practice beneath the text, glimpsed indirectly through the mediation of a crowded conglomeration of apparatus, manipulation, observation, detection, and labor. Natural processes are inferred from the observed reactions of materials in the laboratory. Any deviation, inaccuracy, or error in the host of scientific tools used to draw such inferences throws the inference into doubt: a fleck of impurity in the glassware, a tremor in the hand of the technician, a glitch in the software controlling a detecting device.

But even setting aside the vicissitudes of material practice, as well as philosophical questions of perception and epistemology, appeals to nature cannot explain the resolution of scientific disputes.⁸⁶ Assertions about proof, truth, and fact are *conclusions* about how an assertion is regarded rather than explanations as to how it came to be so regarded.⁸⁷ History (including recent history) repeatedly demonstrates that many scientific truths go unaccepted or remain controversial, and many empirical facts remain disputed or rejected—the efficacy of vaccines, the impact of carbon emissions, the age of the earth, and so on.⁸⁸ It is plain that social processes lead to acceptance of some assertions as truthful proven facts, and to rejection or ongoing disputation about others.

Thus, the better approach is to consider what types of social processes are involved in scientific acceptance, and what outcome those processes will yield under particular circumstances. Science and technology studies long ago developed methods for investigating and determining the movement of scientific knowledge from controversial speculation to accepted fact, assessing the social structures that shift propositions from one category into the other.⁸⁹ A variety of processes and, yes, strategies have been identified that confer stability and le-

85. LATOUR, *supra* note 1, at 67.

86. *Id.* at 88–90.

87. *Id.* at 90.

88. See Bastiaan T. Rutjens et al., *Science Skepticism in Times of COVID-19*, 24 GROUP PROC. & INTERGROUP REL. 276 (2021) (discussing social rejection of empirical evidence regarding vaccination and global warming).

89. LATOUR, *supra* note 1, at 23.

gitimacy, or stated conversely, that quell ongoing controversy over a given assertion. Scientific papers are known to employ a range of rhetorical devices to align and channel resources toward acceptance.⁹⁰ Some of these devices are persuasive techniques in general use for any type of semantic content. But others are signature maneuvers of the scientific genre that may in fact be said to define the practice of science and technical research.

At some point, if a scientific assertion is successful, closure is reached on the doubts and controversies surrounding the scientific statement, and it becomes accepted as a “fact.” This state of factual closure has been dubbed a “black box,” as the internal coherence of the assertion after closure subsequently goes largely unexamined and is no longer questioned.⁹¹ The scientific fact that then enters common usage constitutes an abbreviation, a kind of shorthand for all of the extensive semantic apparatus supporting the acceptance of the statements. The supporting background becomes in effect invisible upon acceptance.⁹² Indeed, the new fact may also become so routine that it disappears from view.⁹³ The stabilized assertion may then itself become a building block for future assertions that have not yet reached closure.

This conceptual framework is especially useful to us when investigating patents in action because, as we have already recognized, the patent is to some extent a legal document in technical clothing, and so has adopted many of the conventions associated with technical and scientific closure.⁹⁴ Even if patent-related facts are not in verity natural facts, they have in many instances taken on the trappings of the natural. For patents to become social facts, we should expect to find stabilizing, reifying processes at work.⁹⁵ There are to be sure also divergences from technoscience, so that recognizing the points of similarity to construction of technical black boxes, as well as the differences from technical constructions, will take us a long way toward understanding the social construction of patents.

Consequently, in parallel to the blackboxing of technoscience, patents in action must somehow become transformed into objects that are stable, routine, and unproblematic when incorporated into licenses, marketing, manufacturing, and investment⁹⁶—that is they must take on the character that we have identified animating the academic diatribes about liminal certainty.⁹⁷ And patents in this respect have something of an advantage over scientific facts, in that they are imbued with formal legal mechanisms that are clearly, explicitly intended to

90. *Id.* at 53–59.

91. *Id.* at 131.

92. See JESSICA LAI, PATENT LAW AND WOMEN: TACKLING GENDER BIAS IN KNOWLEDGE GOVERNANCE 165 (2022) (describing the invisibility of accepted knowledge networks).

93. BRUNO LATOUR, PANDORA’S HOPE: ESSAYS ON THE REALITY OF SCIENCE STUDIES 304 (1999).

94. See *supra* note 52–53 and accompanying text.

95. See LATOUR, *supra* note 1, at 92 (explaining the reification of scientific concepts as black boxes).

96. *Id.* at 91–92.

97. See *supra* notes 42–44 and accompanying text.

achieve social closure. If necessary, closure—acceptance of the patent entity—may be enforced by means of judicial compulsion.⁹⁸ This coercive power sets patents distinctly apart from technical publications; it would be odd and deeply troubling if the coercive power of the state were deployed to penalize individual departures from scientific consensus.⁹⁹ But such coercion is fully intended to accompany the exclusive legal rights that attach to a patent.

We might be tempted to say that this settles the matter for us, that patents are the subject of legal recognition and enforcement and that those formalities establish a patent's social coherence. But the chicken and the egg are not so easily separated when probing social artifacts. A patent is an unlikely candidate for judicial consideration unless it already constitutes a coherent entity for such consideration. Moreover, patents are routinely the objects of private transactional consideration—licensing, sales, transfers—without invoking any legal coercion. Indeed, we know that the vast majority of patents are never formally enforced, and it has been suggested that the patents that ultimately appear in enforcement actions are the robust ones that actually matter.¹⁰⁰ Thus, we may just as well say patents merit judicial enforcement because they are socially coherent as to say that judicial enforcement of patents lends them social coherence. Legal recognition and enforcement surely contribute to the closure of the patent black box, but patent enforcement is as much a *result* as it is a *cause* of patent closure—the patent object and its exclusivity are co-constructed.

VI. RECRUITING ALLIES

The principle of co-construction that we have just divined from patent enforcement applies with equal force throughout the trajectory of patents in action. It alerts us that we must take care to separate conclusions from premises, and we cannot use the former to justify or explain the latter. We frequently say that there is something called the invention, and that it has the qualities of novelty, utility, and nonobviousness, and that because it has those qualities it deserves the exclusive rights associated with a patent. And so it seems once the patent has issued, the invention limitations are fixed, and the matter is resolved. But we might equally well say that *because a patent has issued*, there is now something called the invention that embodies the qualities of novelty, utility and non-obviousness.¹⁰¹ Before the patent issued, before the application reached closure, the existence of an invention, let alone an invention with the patentable qualities of novelty, utility, and nonobviousness, was a matter of controversy and doubt.

98. See 35 U.S.C. § 281 (“A patentee shall have remedy by civil action for infringement of his patent.”).

99. The political enforcement of scientific ideology and practice periodically occurs, perhaps most famously in the repudiation of Mendellian genetics in favor of enforced Lysenkoism in the former Soviet Union. See Yongsheng Liu et al., *Science and Politics*, 10 EMBO REP. 938 (2009); Charles A. Leone, *Genetics: Lysenko versus Mendel*, 55 TRANS. KANSAS ACAD SCI. 369 (1952).

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

101. See Madison, *supra* note 20, at 412 (observing that “patentable things are constructed by the law, but that the law is [also] striving to understand their essential or ‘true’ character”).

Thus, patentability is the *outcome* of settling a controversy, and so cannot be used to explain how the controversy was settled. We cannot simply say “the invention merits a patent because it was novel, useful, and nonobvious”; these characteristics are the conclusions arrived at, not the premises begun with. Something called the invention emerges in the course of patent examination and prosecution (and perhaps other subsequent proceedings such as litigation) as it takes on the qualities of novelty, utility, and nonobviousness. These qualities of patentability are the product of social construction, and are produced by forming associations with supporting resources. They are the *consequence* rather than the cause of interaction among such resources.¹⁰²

We therefore turn our attention to identifying and understanding the associations and resources that interact to resolve controversies and close the box. In science, this process of blackboxing occurs largely through the recruitment of conceptual and rhetorical allies that are dragooned into service to support the argument of a given paper.¹⁰³ Long lists of references are cited to buttress and support various assertions in the paper.¹⁰⁴ These add incontrovertible weight to the acceptance of the paper by means of sheer intimidation. Scientific results for a given paper are rarely replicated, and going back to check and replicate the results of the previous publications that are cited in support of the most recent results is even less likely. The references that are cited in a paper will themselves press into service yet other, earlier references, forming long concatenated chains of interlinking reliance.¹⁰⁵

As controversies over scientific assertions become more detailed, they inevitably become more technical.¹⁰⁶ The assertion will necessarily rely upon an expanding network of supporting claims, so that verifying an assertion on its face becomes infeasible; the veracity of the assertion will depend upon the accuracy of a supporting measuring device, on the efficacy of a reagent, on the precision of a mathematical constant. Each of these in turn depends upon its own support structure of practices, references, and verifications. Supporting the primary assertion therefore relies on recruiting additional resources to authenticate the network of contributions underlying the assertion—citations to references explaining the underlying support. Each reference contains multitudes. Challenging or even assessing the primary claim therefore requires investigation of the logarithmically increasing constellation of resources upon which the assertion is based.¹⁰⁷

The chain of references may of course be turtles all the way down; there may be no established foundation for stacking references upon references. But the ultimate reader at the end of the stack is unlikely to discover this. End-point readers typically accept or assume that the references cited, and the references

102. Cf. Margaret Jane Radin, *Reconsidering the Rule of Law*, 69 B.U. L. REV. 781, 783 (1989) (“[A]greement in action does not *follow* from their being a pre-existing rule; agreement in action is only the basis for claiming that there *is* a rule.”).

103. LATOUR, *supra* note 1, at 33, 62.

104. *Id.* at 48.

105. *Id.* at 80.

106. *Id.* at 30.

107. *Id.* at 80.

cited by the references, and so on down the chain, are already established or vetted. Thoroughly checking every link in the chain of references that has been amassed to support a particular paper rarely, if ever happens. Carefully examining every link in the chain would require exhaustive effort, and the reader is more likely to simply acquiesce in the face of the armies of citations marshalled in defense of the results currently being inspected.

This is not to say that the network supporting a scientific claim escapes scrutiny. Scientific publications do typically undergo a process of peer review by which the warp and weft of the paper will be meticulously examined for rhetorical flaws—for gaps in the paper’s reasoning or citation apparatus that deviate from sound expectation. But the paper is calculated to resist such prodding, armored with its thick plating of technical details.¹⁰⁸ Reviewers face a text stratified into a maze of references, tables, graphs, and structures.¹⁰⁹ Even the most technically sophisticated are unlikely to assume the formidable task of reviewing the bona fides of each prior reference—those black boxes are already closed. Reading and critiquing the logic of the current, open set of assertions is quite a different type of vetting than attempting to reproduce the apparatus, the labor, the observations, recording, and collection that—at least purportedly—went into each link of the citation chain.

The same dependency strategy, the same recruitment of textual references that is seen in science, is true of patents, which have adopted the arrays of successive barricades and defenses that are characteristic of scientific discourse.¹¹⁰ In some cases, the allies recruited to support the patent may enhance the qualities of the claimed invention by affirmatively supporting the inventor’s assertions regarding the merit of the claimed invention—the cited references may be dragooned into demonstrating the utility or plausibility of the claimed invention. But even more often, the citation constitutes a negative recruitment practice, shoring up the novelty or nonobviousness of the claimed invention by distinguishing it from the prior art.¹¹¹ To support the assertion that the invention is nonobvious or novel, the textual claims of the patent must be compared to the prior art, and so past references must be recruited to differentiate the claimed invention from previously disclosed art. Such references serve as a kind of negative support, to demonstrate that the claimed invention does not read on disclosures already known.

The examiner is not only expected to evaluate the references that the applicant does disclose, but to attempt to identify references that the applicant failed to disclose. Yet, thoroughly vetting either such body of references would require an investigation into their networks of citation for accuracy and veracity. As a

108. *Id.* at 46.

109. *Id.* at 48.

110. *Id.*; see also Thambisetty, *supra* note 19, at 229 (suggesting that the stratified rhetorical strategies found in scientific publication are repeated in patent prosecution).

111. See Myers, *supra* note 8, at 85–86 (arguing that patent citations are typically marshalled to distinguish the claimed invention from prior art); cf. LATOUR, *supra* note 1, at 36–37 (explaining the strategy of scientific citation to distinguish and negate contrary prior literature).

practical matter, the bureaucrats housed in the Patent Office lack the time or resources to identify and verify every pertinent reference supporting the primary claims of the patent, let alone to vet the bona fides of the assertions in each reference that might support or undermine the application.¹¹² There is no realistic possibility that the Patent Office will ever be funded at a level to finance such a massive undertaking.¹¹³ Time and personnel are limited; the workload is substantial, and the formal investigation of the claims soon ends. The network of references is never traced to its ends.

The networks of reliance created by citation recruitment are typically quite elaborate and extensive, as shown by the numerous studies that have examined the frequency and interconnection of patent references.¹¹⁴ Of course, such studies typically evaluate citation “networks” in order to assess the reliance of certain patents on subsequent patents that reference one another. Such studies have thus taken the network relationships as a measure of the importance of particular patents to other patents in terms of influence, innovation, or emulation. But from the standpoint of rhetorical recruitment, citations are playing quite another role, not so much as influences or inspiration as armor or even ammunition for a confrontation. This is not to say that patent citation networks are irrelevant to considerations of influence, but rather that these studies adopt a surprisingly naïve account of how and why patents are cited, accepting at face value the representations of the patent community as to the purpose of citations.

The gravamen of this observation is that the structure of scientific forms and practices, adopted in the patent system, makes prohibitively costly any deep or searching probe of a new proposition, and this is perhaps the primary mechanism for reaching scientific closure.¹¹⁵ So, too, is the inquiry into the network of allies encountered when considering the closure of the patent box.¹¹⁶ Disput-

112. Michael D. Frakes & Melissa F. Wasserman, *Irrational Ignorance at the Patent Office*, 72 VAND. L. REV. 975, 978–79 (2019).

113. See Doug Lichtman, *Aligning Patent Presumptions with the Reality of Patent Review: A Proposal for Patent Reform 5* (The Brookings Inst. Discussion Paper 2006-10, 2006) (noting that a Patent Office budget accommodating full examination “would cost billions”); see also Mark A. Lemley, *Fixing the Patent Office*, 13 INNOVATION POL’Y & ECON. 83, 85–86 (2013) (discussing the limitations of Patent Office funding structures).

114. See, e.g., Laura G. Pedraza-Fariña & Ryan Whelan, *A Network Theory of Patentability*, 87 U. CHI. L. REV. 63 (2020); Andrew W. Torrance & Jevin D. West, *All Patents Great and Small: A Big Data Network Approach to Valuation*, 20 VA. J. L. & TECH. 466 (2017); Katherine J. Strandburg, et al., *Patent Citation Networks Revisited: Signs of a Twenty-First Century Change?*, 87 N.C. L. REV. 1657 (2009); Katherine J. Strandburg et. al., *Law and the Science of Networks: An Overview and an Application to the “Patent Explosion,”* 21 BERKELEY TECH. L.J. 1293 (2006).

115. Cf. LATOUR, *supra* note 1, at 48 (“The transformation of the usual literature [into supporting allies] is a sure indicator that we are now faced with a technical or scientific text.”).

116. See Thambisetty, *supra* note 19, at 230 (suggesting that patent examination constructs stratified networks that are costly to disentangle). It is essential to recognize that such patent-enabling networks are very different creatures than those considered by Professors Janis and Holbrook, who cite to works relying on Actor Network Theory in the apparently mistaken understanding that such networks are communicative networks. See Mark D. Janis & Timothy R. Holbrook, *Patent Law’s Audience*, 97 MINN. L. REV. 72, 76 n.12 (2012). To the contrary, such allies may well constitute *uncommunicative* networks. In any event, they perform an entirely different function.

ing the claims of a patent is costly, and not merely in terms of monetary sums expended, although that may certainly become a significant deterrent to continued contestation of a claim.¹¹⁷ Either scientific or patent closure relies upon investments of time, effort, and attention to create solid coherence of the claims at issue. Each type of document requires its own textual crafting intended to secure it against future tampering. Each requires some type of publication process, peer review in the case of the technical paper, and formal patent office examination in the case of the patent. But in the case of the patent document, the costs and efforts of the publication process are heightened, typically requiring a specialized (and costly) representative to shepherd a patent application through a federal bureaucratic inquiry.¹¹⁸

VII. EXCLUDING READERS

A further implication of this marshalling of technical allies in technoscientific controversies is the circumscription of the audience for any scientific assertion.¹¹⁹ The language, the jargon, and the references deployed in a scientific controversy are highly specialized. Much of the argument will be couched in numbers that require expert knowledge of mathematics or statistics to comprehend, and which appear to be authoritative on their face.¹²⁰ As a rule, the more controversial the assertion, the more technical or specialized the defense of the assertion will become.¹²¹ Only those with specialized knowledge and resources can engage in the give and take of the text, the strokes and counterstrokes of assertions and dissents, and the stacking of references to ward off anticipated dissents. The vast majority of readers will be excluded from following or vetting the argument, even if they are themselves knowledgeable in some technical field—only specialists in the particular field of knowledge circumscribed by the document will be equipped to poke and pry at the box. This means fewer skeptics can legitimately participate in challenging an assertion. “Plain language for science” is not a norm or expectation for technical exchange.

This strategy of excluding the majority of readers is also manifest in patent practice. We have already described the technical format of the patent, which uses language unfamiliar to the lay reader, and for that matter to the majority of legal practitioners.¹²² Black letter patent law asserts that the audience for the text is not the actual technical community, or any technically knowledgeable reader, but an entirely fictional imaginary imbued with knowledge and qualities that no

117. LATOUR, *supra* note 1, at 69–70.

118. See Kara W. Swanson, *The Emergence of the Professional Patent Practitioner*, 50 *TECH. & CULT.* 519 (2009) (tracing the development and significance of specialized patent prosecutors).

119. LATOUR, *supra* note 1, at 52.

120. See THEODORE M. PORTER, *TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE* 7–8 (1995) (discussing the ostensible authority of numerical representations).

121. LATOUR, *supra* note 1, at 52.

122. See *supra* notes 52–53 and accompanying text.

actual reader would ever have.¹²³ The composition of any document always entails an expected or ideal reader to whom the document is addressed;¹²⁴ in the case of the patent this putative reader is purportedly the “Person Having Ordinary Skill in the Art” or “PHOSITA,” a legal doppelganger that does not correspond to any actual person or group of persons.¹²⁵

We have previously seen that the subject of the patent, the claimed invention, is entirely intertextual,¹²⁶ and so, too, is this putative reader of the patent. The PHOSITA is a fictional construct composed of the sum total of published information in the relevant field—the skill and knowledge of the imaginary PHOSITA is constituted by prior art publications.¹²⁷ The statutory standard for patenting is tied to this documentary construct; the patent must teach how to make and use the claimed invention in sufficient detail that the PHOSITA, perfectly knowing the relevant literature, could practice the invention.¹²⁸ Similarly, the claimed invention is only patentable if it would not be obvious to the PHOSITA, who again is presumed to perfectly know the prior art literature.¹²⁹ The PHOSITA also appears repeatedly throughout common-law patent doctrine, for example, as a metric in assessing the linguistic acceptability of the patent claims.¹³⁰

Thus, patent law purports to address a technically skilled (if imaginary) reader. But at some level this fictional target audience makes very little sense, given that the patent is unquestionably a legal document.¹³¹ The claims of the patent set out the scope of legal rights being asserted by the applicant. They do so in technical language—but they describe a legal entitlement, not a technical specification. Strangely, the examiners who evaluate the patent application are not lawyers and have essentially no legal training to speak of.¹³² The intermediaries who represent applicants before the Patent Office are similarly required to have technical training, but legal training is optional.¹³³

On the other hand, the judge who is likely to adjudicate a later dispute over the claims typically has no technical training, and while she is likely superbly qualified to think about the legal aspects of the patent entitlement, she is probably illiterate as to the language in which it is expressed.¹³⁴ The document might as well be written in Sanskrit or Aramaic, particularly if the inventor exercises

123. See Janis & Holbrook, *supra* note 116, at 95–96 (observing that patent claims unintelligible to the lay reader are directed to a construct, the PHOSITA).

124. LATOUR, *supra* note 1, at 52.

125. John O. Tresansky, *PHOSITA-The Ubiquitous and Enigmatic Person in Patent Law*, 73 J. PAT. & TRADEMARK OFF. SOC'Y 37 (1991).

126. See *supra* note 18 and accompanying text.

127. See *In re Winslow*, 365 F.2d 1017 (C.C.P.A. 1966).

128. 35 U.S.C. § 112(a).

129. *Id.* § 103.

130. See Craig Allen Nard, *A Theory of Claim Interpretation*, 14 HARV. J. L. & TECH. 1, 6 (2000).

131. Thambisetty, *supra* note 19, at 228.

132. Burk & Reyman, *supra* note 10, at 173.

133. *Id.* at 176.

134. *Id.* at 173.

her prerogative to “be her own lexicographer” and literally makes terminology up.¹³⁵ The attorneys who advocate for and against the survival of the patent box frequently have no technical training, relying on the interpretation of others to build their arguments. The transactional attorneys who build public offerings or venture capital investments around the patent will be equally mystified as to what it actually says. None of these can be the semiotic character to whom the text is addressed.¹³⁶

Instead, understanding the type of strategic positioning deployed to reach the closure of controversies helps us to see what is occurring in securing the patent black box. We may now understand why the patent system adopts a technical idiom for what is manifestly a legal text. Some observers have naturally supposed that it has something to do with informing technical readers of its contents.¹³⁷ But on closer consideration it should be clear that nothing could be further from the truth. Patents secure social facts in the guise of the natural fact. They employ a format that repels every reader except a patent lawyer.¹³⁸ The strategy for the patent proponent is to tie together an overwhelming array of allies in a unique and restrictive jargon in order to frame and secure the patent box. Specialized jargon drastically limits the readers of the patent, and hence the challenges that might be leveled against its coherence.

Thus the patent is a legal document written in technical language, creating a hybrid text that cannot be readily understood by either technicians *or* lawyers outside the community of patent law initiates.¹³⁹ Recall that our brief in this investigation is to follow the action, to see what is done rather than what is said—and however much it is said that the PHOSITA is the audience for the patent text, we know that cannot actually be the case. Critics of the system are quite right that any review of the text demonstrates that it is not intended for a technical audience; the difference here is that we accept that as the practice and ask what it means, rather than demanding it meet our presuppositions. Clearly it means that the controversy to be closed to create the patent object is not technical. One might suppose that this realization implies that patent closure entails a legal controversy, but that cannot be right, either; we have said that the ideal reader is not a lawyer, or not just any lawyer.¹⁴⁰ It seems clear that the audience for the text is in fact patent lawyers, who are the only readers with the hybrid training, the access to both legal and technical resources, and the grasp of the

135. See *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 990 (Fed. Cir. 1999).

136. LATOUR, *supra* note 1, at 53 (“[T]his [ideal] reader is not a person in the flesh, but a person on paper, a semiotic character.”) (emphasis omitted).

137. See, e.g., *supra* note 13 and sources cited therein.

138. See Robin Feldman, *Plain Language Patents*, 17 TEX. INTELL. PROP. L.J. 289, 291–92 (2009).

139. See Burk & Reyman, *supra* note 10, at 170; Thambisetty, *supra* note 19, at 229 (“Even a simple reading of patent claims will show that there is no prose quite like it.”). Professor Seymore refers to the esoterica of patent texts as “patentese.” See Seymore, *supra* note 13, at 633. Following Latour, Professor Thambisetty characterizes it under the hybrid rubric of “technolaw.” See Thambisetty, *supra* note 19, at 222.

140. See *supra* notes 136–138 and accompanying text.

patent's peculiar language.¹⁴¹ Other readers are effectively excluded, in particular by the pretext of writing for the PHOSITA.

VIII. SUBVERTING ALLIES

We have seen that the successful patent reaches coherence in large measure by recruiting and positioning previously existing black boxes, not as a crowd of disorderly citations, but carefully and purposefully arrayed to support its acceptance and closure. Now we might add that the reciprocal strategy for an antagonist is to sever the connections between the supporting statements, returning them to an uncoordinated aggregation. In the case of the published patent, such an antagonist might be a competitor or an accused infringer. But in the course of patent examination, this role is played formally by the patent examiner, who is cast in the role of the loyal opposition, creating a prosecution history of real or imagined objections that the applicant must overcome.

We can glean a sense of how referential allies are recruited, aligned, and sometimes subverted by returning to our third factual assertion above, concerning the treatment of Alzheimer's disease with galanthamine.¹⁴² The inventor of this method was perfectly welcome to apply for a patent on the method without having physically performed or tested it—indeed, when this application was placed before the patent office, that is exactly what the inventor of the method did. Rather than recruiting empirical or material allies to align the elements of the invention, the applicant assembled textual references in an arrangement intended to propel the application through a test of the claimed invention's rhetorical strength.¹⁴³

A key component in this campaign would be a logical showing of utility, and hence a logical showing of enablement.¹⁴⁴ All the unruly details regarding the use and operation of the claimed invention would need to be brought into alignment and tidied up. Lacking empirical allies from the laboratory, textual references were arrayed to do the job. The references marshalled in the application first declare that Alzheimer's disease is associated with a lack of acetylcholine, and that galanthamine blocks cholinesterase, an enzyme that degrades acetylcholine.¹⁴⁵ Galanthamine can thus be used to increase levels of acetylcholine, and since more acetylcholine means less Alzheimer's, then by the transitive property, galanthamine may be used to treat Alzheimer's disease. Additional sources were provided to show that galanthamine has just this kind of effect in

141. See Janis & Holbrook, *supra* note 116, at 87–88 (discussing the role of patent practitioners as interpretive intermediaries); see also Burk & Lemley, *supra* 34, at 1755 (noting that in many instances, patent law implicitly assumes the audience consists of patent lawyers).

142. See *supra* note 78 and accompanying text.

143. *Janssen Pharmaceutica v. Teva Pharms. USA Inc.*, 583 F.3d 1317, 1321 (Fed. Cir. 2009).

144. *Id.* at 1323 (“Enablement is closely related to the requirement for utility.”). Failure to show utility is necessarily failure to show enablement. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1358 (Fed. Cir. 1999).

145. *Janssen*, 583 F.3d. at 1320–22.

animals with memory loss similar to that seen in humans with Alzheimer's disease.¹⁴⁶

Each of these references constitutes its own previously closed black box, which an examiner would be reluctant to unpack, as they require too much effort and take the examination too far afield. The boxes are stacked so as to channel a skeptical examiner toward accepting the invention's coherence.¹⁴⁷ A common strategy is to arrange the references in a sequence of logical induction, from a particular instance to a broader generalized rule.¹⁴⁸ This is in part the strategy of the galanthamine application: galanthamine treats memory loss in mice; mice are mammals with many biological characteristics similar to humans; galanthamine may be used to treat memory loss—Alzheimer's disease—in humans.

Such logic for the utility argument seems compelling. But channeling skeptics in the proper direction is tricky. The channel may leak or spill over into a different inquiry.¹⁴⁹ The allied texts recruited to support the patent claim must be positioned so as to cover the gaps in the box the applicant hopes to close.¹⁵⁰ This strategy may be both an advantage and a liability—it may cover the holes, but it may equally well signal to the skeptic just where to push in order to topple the whole house of cards.¹⁵¹ By reinforcing the seams in the structure, the weak points may be revealed.¹⁵²

Additionally, when stacking the references to extend an inference, the extension must cover just the right interval¹⁵³—if extended too little from what is already known, the claim will be obvious. But if extended too far from what is already known, the claim may not be enabled.¹⁵⁴ And indeed this is exactly the trap into which the galanthamine claims fell—the worst of all possible outcomes. Because the invention was cobbled together from the logical relationships between existing black boxes, the examiner rejected the application for failing the obviousness criterion.¹⁵⁵ The examiner's counterstroke was to point out that if the claimed invention was based on logical associations, the PHOSITA could make those associations without the aid of the patent, and so the use of galanthamine to treat Alzheimer's disease must by definition be obvious over the prior art.¹⁵⁶

146. *Id.*

147. See LATOUR, *supra* note 1, at 57 (describing how the skeptical reader is channeled toward acceptance of a proposition).

148. See *id.* at 51 (explaining how assertions are layered to extend a proposition).

149. See *id.* at 57.

150. *Id.* at 50.

151. *Id.*

152. *Id.* at 50–51.

153. *Id.* at 51–52.

154. See Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1202 (2002) (noting the reciprocal relationship between obviousness and disclosure); see also Donald S. Chisum, *Anticipation, Enablement, and Obviousness: An Eternal Golden Braid*, 15 AIPLA Q.J. 57, 67–68 (1987) (discussing the interaction between enabling disclosure and obviousness over the prior art).

155. *Janssen Pharmaceutica v. Teva Pharms. USA Inc.*, 583 F.3d 1317, 1322 (Fed. Cir. 2009).

156. *Id.*

So the applicant's allies were outflanked, but the applicant believed he had a card left to play by asserting that the stacking of the references was *not* obvious; that is, instead the person of ordinary skill could not make the necessary logical connections without the assistance of the patent.¹⁵⁷ Only with the patent's guidance could the proper connections between galanthamine and treatment be made. This clever argument, however, proved to be a fatal misstep. While it addressed the problem of obviousness, it opened the door to a different strategy to prove the incoherence of the application: If the logic of the patent is too difficult for the PHOSITA to piece together without assistance, then it now seems that the applicant failed to enable practice of the claimed invention—that is, the person of ordinary skill following the teachings of the patent would lack sufficient information to put it into practice.¹⁵⁸ Thus while strengthening the nonobviousness of the invention, the applicant undermined its enablement. The inference was extended both too far and not far enough, so that the whole assertion fell into the crevasse.¹⁵⁹

Note that the same outcome would inevitably result had the game been played the other way, that is, if the examiner had initially asserted that the patent lacked the network of resources necessary to enable the claimed invention. The response of the applicant to shore up enablement would undoubtedly be that the network of enablement allies includes the information, not necessarily stated in the patent, that would be possessed by the person of ordinary skill at the time of filing.¹⁶⁰ And so the applicant, outflanked by the enablement rejections, would be constrained to assert that the allies deployed in the application were sufficient when combined with the external information already in the possession of the intended audience—the person of ordinary skill would already know enough to fill in any gaps. But of course if the person of ordinary skill already possesses the information necessary to piece together the use of galanthamine, then such a use will be obvious, and the applicant ends up back where he started.

This trap is to some extent a result of the formal procedural rules of patent examination. The applicant is stuck with whatever allies were marshalled in the initial application; the claimed invention must be shown to have been enabled as of the date of filing.¹⁶¹ This is intended to penalize the applicant who is too hasty; there are strong incentives to file an application as quickly as possible, but disincentives for filing before all the needed allies have been arranged so as to tightly close the box.¹⁶² Some time is needed to recruit the necessary allies in

157. *Id.*

158. *Id.* at 1323.

159. See LATOUR, *supra* note 1, at 51 (“If you are too timid, your paper will be lost, as it will if you are too audacious.”).

160. Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc., 166 F.3d 1190, 1196 (Fed. Cir. 1999).

161. Timothy R. Holbrook, *Patent Disclosures and Time*, 69 VAND. L. REV. 1459, 1480 (2019); Mark A. Lemley, *The Changing Meaning of Patent Claim Terms*, 104 MICH. L. REV. 101, 106–07 (2005).

162. See Holbrook, *supra* note 161; Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65 (2009) (questioning incentives to file patents quickly).

support of the application, especially if they are empirically generated allies, but taking too much time risks losing the game to a rival who is quicker to file an application.

Note, too, that the strategy to render the application ineffectual is not merely to cut the ties that tether the references together, allowing the coherence of the application to unravel. Often that alone would be sufficient for the invention to come undone. But here, at each stroke and counterstroke of the controversy the galanthamine references have changed sides; rather than supporting the enablement and utility of the proposed invention, they are instead redeployed to dispute and ultimately defeat the application.¹⁶³ If the PHOSITA has sufficient knowledge to proceed without empirical proof, then the invention is obvious; if the PHOSITA could not proceed without further proof, then the disclosure fails enablement. At each turn, the allies that were marshalled to support the application are now betraying the applicant who assembled them; by realigning these allies, the opponent dragoons them into supporting the dissenting argument.

IX. TRIALS OF STRENGTH

Our failed galanthamine example brings us to second core mechanism for “black box” closure, which has been dubbed the “trial of strength.”¹⁶⁴ Such trials constitute subjecting the social object to various conceptual stresses in a selected proving ground intended to demonstrate the coherence of its component network.¹⁶⁵ The purpose is to create a new object by means of a set of performances that will demonstrate the competencies of the object.¹⁶⁶ The troubling aspect of prophetic patent examples, causing obvious discomfort to those who would like patents to constitute technical treatises, is that they have never undergone such trials of strength. They are entirely the product of imagination.

Scientific assertions typically undergo such tests of strength in the arena of the laboratory or “in the field,” not only to prove the coherence of their textual alliances, but to add additional allied support from physical materials that are themselves the objects of blackboxed closure.¹⁶⁷ The empirical testing of a scientific assertion connects it not only to an array of experimental protocols, but to the vast array of apparatus stocked in the material arena: the physical samples for comparison and controls; the reagents; the detecting and recording gear; the equipment for storage, transfer, and mixing; the electronic or paper outputs of various devices.

Defects in the coherence of any of this equipment might render the experimental or observational results unconvincing. Might the measurement device be biased? Might the calibration of some sensor be faulty? Might the reagents have

163. See LATOUR, *supra* note 1, at 83.

164. *Id.* at 93 (“Reality, as the latin word *res* indicates, is what *resists*. What does it resist? *Trials of strength.*”).

165. *Id.* at 78, 93.

166. *Cf. id.* at 89 (explaining that the objects behind a text are defined by their performances and competencies).

167. *Id.* at 79, 82.

been contaminated? Might the procedures for sample preparation have been deficient? But investigating each of these material allies requires investigating an expanding network that supports each of them—that reagent used in the experiment was assembled from a mixture of substances that each must be evaluated, using a formula that must itself be investigated, using scales and volumetric measures that must be gauged, and so on in an exponentially expanding network of inputs. Again, this dramatically raises the cost of continued challenges.¹⁶⁸ Challenging the reliability and accuracy of each item of equipment poses an overwhelmingly lengthy, expensive, and intimidating prospect. The assertion must generally be accepted on faith as sound and acceptable because no one has the resources to ferret out every possible lapse in material or method.

In characterizing the material verification needed for scientific closure, we of course speak to some degree in generalities—there are branches of science and modes of scientific reasoning in which the articulation is purely abstract, relying on such mathematical models or gedanken experiments to further their theses. Such prophetic imaginaries are by no means foreign to the development of scientific assertions. No one has ever ridden on Einstein’s trolley at the speed of light,¹⁶⁹ seen Kekule’s Ouroboros,¹⁷⁰ petted Schrödinger’s cat,¹⁷¹ or sold their soul to Maxwell’s demon.¹⁷² Facts are not composed of data; a statement becomes a fact when subsequent recipients regard it as such.¹⁷³ But the scientific convention is that even such abstractions sooner or later will be subjected to empirical verification to see if their rhetorical structure will withstand the stress of comparison to material outcomes.

Patents generally do *not* undergo such tests in an empirical arena. In some cases, technology described in a patent may have undergone empirical trials of strength, but such material vetting, when it occurs, lies several degrees of association removed from the application document. Neither are empirical trials of strength a requirement for patenting. Patent applications may, in the course of their development, entail the costs of laborious observation and instrumentation that are characteristic of technical publications. But as mentioned previously, patent applicants are perfectly free to sidestep the messy details of physical instantiation, or “reduction to practice” of their inventions, and instead file a “paper patent” that is purely textual.¹⁷⁴ So long as the application includes a sufficiently detailed textual description of how to make and use the invention—even if this description is wholly imaginary—filing the application is counted

168. *Id.* at 79.

169. See S. JAMES GATES JR. & CATHERINE PELLETIER, PROVING EINSTEIN RIGHT: THE DARING EXPEDITIONS THAT CHANGED HOW WE LOOK AT THE UNIVERSE 28 (2019).

170. ALAN J. ROCKE, IMAGE AND REALITY: KEKULÉ, KOPP, AND THE SCIENTIFIC IMAGINATION 313 (2010).

171. John D. Trimmer, *The Present Situation in Quantum Mechanics: A Translation of Schrödinger’s “Cat Paradox” Paper*, 124 PROC. AM. PHIL. SOC. 323 (1980).

172. JAMES CLERK MAXWELL, THEORY OF HEAT 338 (rev. ed. 1908); see also *The Sorting Demon of Maxwell*, 20 NATURE 126 (1879) (explaining the nature of Maxwell’s imaginary being).

173. LATOUR, *supra* note 1, at 42–43.

174. See *supra* note 21 and accompanying text.

as a “constructive reduction to practice” that is legally as efficacious as actually building or testing the claimed invention.¹⁷⁵

At the same time, the Patent Office itself makes no attempt to physically verify the operation of the invention claimed in an application.¹⁷⁶ Modern patent examination, like the patent itself, is purely intertextual; the examiner will attempt to assess the internal coherence of the application text, looking for contradictions or ambiguities. The examiner will also compare the application text to other documents, particularly to prior patents or published materials that can be located in the short time the examiner spends with the application. The applicant is under an obligation to disclose any such relevant reference that she knows about, and the examiner will invest some time in his own search of databases.¹⁷⁷ If references are missed—and they likely will be—there are proceedings later in the life of the patent where they can be raised.¹⁷⁸ But such challenges after the grant of the patent impose extra costs on a challenger, who must in any event overcome a legal presumption of validity for the published patent.¹⁷⁹

The “paper patent” is in many ways the endpoint of the observation by Latour that nature is the result rather than the cause of aligning allies in support of a proposition.¹⁸⁰ Scientific papers are a matter of rhetorical contrivance, recruiting and managing a host of external references in order to support their veracity, as well as a host of internal texts—charts, tables, graphs, figures—to the same end.¹⁸¹ The latter are generally intended to represent the data collected in physical activity, but of course the reader of a scientific paper generally will have no idea whether they do or not. Only if the reader chooses to reproduce the activity on which the internal support is allegedly based will he know how factual the paper’s representations are. And of course, very few readers ever do reenact the data gathering exhibited in a paper, since there is little scientific glory in mere reproduction of past experiments.

It is worth noting in the context of technical controversies that the primacy of text is also the convention on which scientific fraud is based—a disjunction between data gathering and data representation. Fraudulent presentation of scientific data is difficult to detect because textual coherence rather than material coherence is the predominant basis for scientific acceptance. Only if an attempt is made to reproduce the purported material experimentation will the discrepancy be discovered. But if the fraudster happens to have guessed correctly, and the fictitious representation matches external phenomena, his failure to materially enact the data will never be caught. Indeed, if such serendipitous correlation between fiction and reality is bold enough, the fraudster might well be hon-

175. See Mark A. Lemley, *Ready for Patenting* 96 B.U. L. REV. 1171, 1178–79 (2016).

176. Sean Seymore, *Patenting Around Failure*, 166 U. PENN. L. REV. 1139, 1160 (2018).

177. See 37 C.F.R. § 1.56 (duty of candor to disclose pertinent art to the Patent Office).

178. See, e.g., 35 U.S.C §§ 302 (request for reexamination); 311 (inter partes review); 321 (post grant review).

179. 35 U.S.C. § 282.

180. LATOUR, *supra* note 1, at 99.

181. *Id.* at 30.

ored—this was almost certainly the case for the Austrian monk Gregor Mendel, whose genetic data on pea plants seems far too statistically pristine to have come from an actual garden, but whose work has nonetheless been lauded for divining the nature of heritable genetic traits.¹⁸²

Where patents are concerned, the primacy of the text is formalized. Experimental data is neither expected nor required to support the claims in a patent application (much to the dismay of current critics).¹⁸³ The workings of the claimed invention are never physically tested by the examining administrative authority, and are only barely rhetorically tested. This in fact rises to the level of a presumption.¹⁸⁴ The position of the Patent Office is to accept whatever representation of utility the applicant provides—only if the stated utility of the invention is on its face so fantastic as to violate known laws and principles of science will the examiner begin to challenge the functions purported in the application.¹⁸⁵ Effectively, in progressing toward closure of the patent box, the Office generally declines to disturb or open the underlying utility box on which closure will be partly based.

The presumption is of course a presumption, and is not absolute. The application may yet be rejected where the assertions made seem on their fact to contradict accepted—which is to say closed and blackboxed—scientific fact.¹⁸⁶ Claims of perpetual motion, cold fusion, or propulsion exceeding the speed of light are judged implausibly fantastic or incredible.¹⁸⁷ Such claims lack conceptual coherence; the technical shape of the proposed object is implausibly out of line with its legal shape. In such outlier cases, the applicant has gone too far to achieve closure—the seams of his box are leaking. He is no longer shielded by the administrative presumptions intended to help him weld them shut. He must now submit to an actual trial of strength if he is to avoid a complete denial of his claims, and must provide empirical data to rebut the rejection imposed upon his application.

This stricture is not applied to inventions that are merely impractical, such as a method for extracting oxygen from rocks on the moon—even though the

182. See Ronald A. Fisher, *Has Mendel's Work Been Rediscovered?*, 1 ANN. SCI. 115 (1936) (arguing that the lack of variance in Mendel's data is statistically improbable); see also ALLAN FRANKLIN ET AL., *ENDING THE MENDEL-FISHER CONTROVERSY* (2008) (collecting critiques and analyses of Mendel's genetic data).

183. Cotropia, *supra* note 162, at 120–22 (advocating proof of actual reduction to practice in patent applications); Sean B. Seymore, *Heightened Enablement in the Unpredictable Arts*, 56 UCLA L. REV. 127, 156–58 (2008) (same); see also Duffy, *supra* note 21 (advocating revival of patent doctrines that favor material practice over paper disclosure).

184. See Sean B. Seymore, *The Presumption of Patentability*, 97 MINN. L. REV. 990, 995–96 (2013) (describing the suite of favorable procedural presumptions patent applicants enjoy).

185. *In re Brana*, 51 F.3d 1560, 1566 (Fed. Cir. 1995).

186. *Id.*

187. See, e.g., *In re Swartz*, 232 F.3d 862 (Fed. Cir. 2000) (upholding rejection to patent claims for cold fusion); *Newman v. Quigg*, 877 F.3d 1575 (Fed. Cir. 1989) (upholding rejection of patent claims to a type of perpetual motion device). The Patent Office may demand a working model of a technically improbable invention. 35 U.S.C. § 114; see also Dennis Crouch, *PTO Requests Model of Warp Drive Invention*, PATENTLY-O (Feb. 19, 2006), https://patentlyo.com/patent/2006/02/pto_requests_mo.html [<https://perma.cc/HM6L-MZMT>].

actual practice of the invention is not possible, unless the predicted use is scientifically impossible, actual proof of implementation will not be required.¹⁸⁸ Thus, claims to invention of perpetual motion machines, which definitionally violate the first or second laws of thermodynamics, will receive a rejection unless the applicant comes forward with supporting data.¹⁸⁹ And yet even in this instance, again, the applicant will routinely submit texts—testamentary evidence, sworn to by the inventor, but written and recorded as a representation of the trial his provisional invention has undergone. The actual inventor is not presented, nor the physical apparatus and equipment of the laboratory. The patent examiner does not visit or observe the site at which the submitted data is developed. So everything occurs on the written record; there is no opportunity or provision for challenging the material support for the application, because there is none.¹⁹⁰

It was not always so. During the nineteenth century, applicants were required to submit to the Patent Office as part of their application a working model of the invention—physical apparatus that the examiner could test, try, and observe, something more than textual exposition.¹⁹¹ This requirement seems better suited to an era in which the paradigmatic technology was mechanical in nature; it seems rather impractical for chemical, biological, or information technologies. Indeed, even the storage of working models that accumulated in the Patent Office posed something of a problem. This practice has long since lapsed, although revival has been proposed by those who are uneasy with the semiotic practice of the modern system.¹⁹² Such proposals suppose that the technical closure of the patent object is coterminous with its legal and social closure—once again assuming an imagined purpose for the patent system, rather than following the action.

When we follow patents in action, something quite different emerges. The presumption of utility employed by the Patent Office serves as an example of substituting institutional or procedural design for recruitment of material allies. Like all procedural burdens, this burden of proof shifts the *costs* of proof, which is to say the costs of settling the controversy. The representations of the applicant are declared to be uncontroversial as presented, on their face. What resources then does the dissenter have to marshal against propositions of dubious exclusivity? It is the challenger who must gather the data, build the laboratory, calibrate the apparatus, reduce the claimed invention to actual practice. This may be an option for the well-financed challenger in later litigation over the

188. See *Ex parte McKay*, 200 USPQ (BNA) 324 (PTO Bd. App. 1975) (finding patent claims for extracting water and oxygen from moon rocks impractical, but not impossible).

189. *In re Swartz*, 232 F.3d 862, 864 (Fed. Cir. 2000).

190. The minor exception to this practice, which proves the rule, is that the Patent Office can demand a working model of the invention. 35 U.S.C. § 114.

191. Alain Pottage, *Law Machines: Scale Models, Forensic Materiality and the Making of Modern Patent Law*, 41 SOC. STUD. SCI. 621 (2011). As mentioned above, the Patent Office can still require a working model of claimed inventions that appear inoperable, which it routinely declines to do. See *supra* note 187.

192. See Seymore, *supra* note 13, at 642 (advocating a requirement for actual reduction to practice, similar to the nineteenth-century-models requirement).

issued patent, but the hapless Patent Office examiner faced with a paper patent never has such resources and is not expected to try. For the patent examiner, documentary allies must suffice, and procedural requirements to marshal such allies are stacked against him. Critics who fear that this arrangement foils technical disclosure are entirely correct—but their concern seems misplaced given that technical disclosure is plainly *not* what the patent arena is designed to facilitate.

Thus, the administrative examination process serves many of the same purposes that empirical trials serve in establishing scientific assertions. Rather than recruiting new allies in the form of technical apparatus, the examination process valorizes the textual and semantic support provided in the application. The availability of the prosecution arena does not stop the controversy, but it shifts the focus and the forum away from the mechanics of the technical and toward the *textual coherence* of the patent document. The physical instantiation, or reduction to practice of the device is left aside, subordinated to a rhetorical contest that determines the immediate conceptual and epistemic solidity of the document. If at some future point one of ordinary skill attempts to practice the invention according to disclosure of the patent and it fails, then the patent may be found invalid for lack of enablement.¹⁹³ But that physical trial is a future and remote contingency. Just as scientific publications are routinely relied upon as legitimate statements of natural fact without any attempt to recreate the experiments on which they are purportedly based, patents are routinely relied upon as legitimate embodiments of social fact without any attempt to verify the disclosures that purportedly enable the claimed invention.¹⁹⁴

In the case of the patent, the performances to which the object is put are purely semantic or epistemic trials, devoid of material trappings, intended to show the characteristics of novelty, utility, and nonobviousness over prior texts. The list of semantic and rhetorical objections that the object has overcome defines its parameters: it is novel in this aspect challenged during examination, it is useful for that purpose debated in the prosecution history, it is nonobvious when contrasted with those prior references brandished by the examiner.¹⁹⁵ In the course of examination, the applicant has the option of overcoming such confrontations by avoiding them, that is, by renaming or redefining the object through amending the patent claims.¹⁹⁶ This alters the shape of the ultimate legal object without altering its technical shape (indeed, attempting to alter the object's technical shape by introducing such "new matter" will incur the penalty of having to start over).¹⁹⁷

193. 35 U.S.C. § 112(a).

194. *Cf.* Thambisetty, *supra* note 19, at 238–39 (arguing that patent examination constructs institutional legitimacy through the development of social facts).

195. *Cf.* LATOUR, *supra* note 1, at 92 ("The point is that the new object emerges from a complex set-up of sedimented elements each of which has been a new object at some point in time and space.").

196. *Cf. id.* at 87–88 ("[T]he new object is a list of written answers to trials. . . . It has no other shape than this list.").

197. 35 U.S.C. § 132.

Of course, some inventions do undergo pre-application empirical trials of strength, which may be incorporated into the patent application. Inventions that have been actually reduced to practice may benefit from the coherence communicated by physical testing—recruiting external allies affords an additional set of empirical black boxes to support closure of the patent application. But here we underscore that actual reduction to practice is neither necessary nor sufficient to close the patent box. Inventions that are only conceptually tested, which is to say constructively reduced to practice, routinely pass semantic muster for patent closure. And inventions that have the support of a wealth of real-world testing data may nonetheless fail to reach the needed level of conceptual solidity and resilience needed for closure. This was long the case for inventions in the “unpredictable arts” of pharmaceutical treatments, which were routinely rejected despite copious supporting data, eventually requiring administrative and judicial adjustment of the relevant legal standard.¹⁹⁸

None of this is in any way optimal for ensuring operability or transparency of the technologies implicated. None of it advances in any serious way the dissemination of scientific information. The investigation of any claim might go on endlessly, but endless resources cannot be committed to such investigations.¹⁹⁹ As in any institution, we expect that the balance of resources committed, set against permissible costs incurred, must be commensurate with the goal to be accomplished. Here the limits set on patent examination are reached quickly, and the expected resource commitment either by the applicant or by the applicant’s bureaucratic opponent is fairly modest. The rules and presumptions followed in prosecution heavily favor and default to issue of the patent—almost as if the examination were largely for show. The patent “quality” that the process favors is not empirical or functional quality,²⁰⁰ but is rather semantic quality. In short, everything we can observe about the process of patent construction appears adapted to reach closure of the patent box fairly quickly, and to keep it firmly closed thereafter.

X. FURTHER ORDEALS

There is much yet to be said about the intricacies of logic and persuasion in Patent Office administration, far more than can be packed into this brief study. But what we have seen is sufficient to show that the social object that emerges from the process of examination and prosecution before the Patent Office is de-

198. *In re Brana*, 51 F.3d 1560 (Fed. Cir. 1995).

199. See Lemley, *supra* note 100 (arguing that committing further resources would not yield commensurate social benefit). Some commentators have argued that commitment of further resources to patent examination would yield economic benefits. See Frakes & Wasserman, *supra* note 112. But all such arguments assume that we already know the role patents are expected to play, rather than considering what role they are in fact playing.

200. See R. Polk Wagner, *Understanding Patent-Quality Mechanisms*, 157 U. PA. L. REV. 2135, 2138 (2009) (defining “patent quality” as the capacity of a patent to meet statutory patentability standards). *But see* Christi J. Guerrini, *Defining Patent Quality*, 82 *FORDHAM L. REV.* 3091, 3098–99 (2014) (distinguishing patent validity from patent quality).

fined by the *list of trials it has overcome* and by the *network of allies it has recruited*. Like the hero of an epic adventure, the claimed invention (and by implication, the inventor) successively overcomes fearsome obstacles placed in its path—the contrary references, the bureaucratic contrivances, the statutory conflicts, the objections of the obstinate examiner—and is reborn with new attributes.²⁰¹ The new object is defined by its prosecution history triumphs: it differs from this reference in that particular way; it has been demonstrated to enable these features; it offers the world that solution to some problem, great or small.²⁰² Each successful application reinscribes the invention with a thousand faces.²⁰³

Perhaps ironically, the purpose for overcoming such heroic trials is for the invention to vanish into the background. Acceptance quells controversy and renders the network of support invisible.²⁰⁴ The successfully closed patent is intended to become so routine that it in effect disappears from view; it becomes the object of possession and trade, no longer the subject of scrutiny and dispute. Of course, either the closed patent box or the closed boxes in its supporting network chain can be reopened under a variety of circumstances—a venture capitalist planning to hinge a sizeable investment on the coherence of the patent may choose to do some independent investigation into the content of the patent box; or an investigative reporter unpacking the practices of, say, the pharmaceutical industry may do the same. In general, though, patent boxes are most likely to be reopened either by market competitors or by accused infringers—and often the box opener is both.

Just as the law provides formal mechanisms for closure, under certain circumstances it provides formal tools for reopening and unpacking the contents of the patent box in a particular fashion—given that the law helps to close the box, it also dictates how that result might be challenged or reversed. As indicated above, in the world of scientific and technical blackboxing, communal norms of empirical investigation and publication offer the recognized and socially legitimate avenues for unpacking natural facts.²⁰⁵ The patent system formally provides for fully adversarial “trials of strength” after issuance of the patent, in which private resources may be committed to finishing the investigative undertaking that did not and indeed cannot occur during examination in the Patent Office.²⁰⁶ Prying apart a well-sealed patent box requires considerable

201. See LATOUR, *supra* note 1, at 53–54; see also Jessica Silbey, *The Mythical Beginnings of Intellectual Property*, 15 GEO. MASON L. REV. 319 (2008) (discussing the narrative roots of intellectual property and of the “heroic inventor.”).

202. See LATOUR, *supra* note 1, at 88; see also Myers, *supra* note 8, at 92 (noting the function of patent texts to “establish a story.”).

203. Cf. JOSEPH CAMPBELL, *THE HERO WITH A THOUSAND FACES* (1949) (exploring the narrative structure associated with the mythological journey of the archetypical hero).

204. LATOUR, *supra* note 1, at 43.

205. See *supra* notes 164–170 and accompanying text.

206. See Saurabh Vishnubhakat et al., *Strategic Decision Making in Dual PTAB and District Court Proceedings*, 31 BERKELEY TECH. L.J. 45 (2016) (examining the interplay between post-grant patent proceedings in federal district court and in the USPTO).

time, effort, and funding, and this kind of investment is most likely to be made by someone who expects to recoup the expenditure by removing the patent as an obstacle to their own goals.²⁰⁷ This advantage may be accomplished by dissipating the coherence of the patent so that it in effect unravels.

However, as in the Patent Office, the rules of the game are purposefully stacked against the subsequent antagonist. We have said that closure of the patent box is a social conclusion that requires acceptance by those who will interact with and build upon the resulting artifact—the investors, the licensees, the follow-on innovators who rely on the coherence of the patent as a solid entity.²⁰⁸ We have said that such closure is based at least in part upon the assistance and certification of legal processes that make acceptance palatable, and we have seen that Patent Office procedure provides a variety of mechanisms to facilitate and sustain the coherence of social closure, in particular presumptions that favor rapid closure.²⁰⁹ The same is true once the black box makes its way into the world; it is secured with a legal presumption of validity that attends the issued patent.²¹⁰

In any subsequent challenge or review of the issued patent, the law requires that a tribunal adopt the initial standpoint that the patent was properly issued and meets the standards of patentability. Skeptics and challengers are required to disprove this presumption, and face an uphill persuasive battle to do so.²¹¹ Moreover, as hinted above, the specialized nature of the patent's language, its facade as a technical document, and its certification by a cadre of technically trained bureaucrats will tend to deter subsequent skeptics from poking and prying at its seams.²¹² Indeed patent owners routinely employ a set of strategies to enhance and leverage the certification of the expert Patent Office, which the lay judiciary will be reluctant to disturb, deferring to the prior technical reviews of the specialized administrative office.²¹³ Thus, the patent black box may in theory be opened for further examination, but in practice often remains intact.

This nearly permanent closure of the patent box underlies recent debates on “patent reform.”²¹⁴ Recall our observations above regarding textuality and sci-

207. See Frakes & Wasserman, *supra* note 112, at 992–94 (describing the substantial costs of litigating patent validity); Lemley, *supra* note 100, at 1502 (same).

208. See *supra* notes 96–97 and accompanying text.

209. See *supra* notes 198–200 and accompanying text.

210. 35 U.S.C. § 282.

211. Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 47, 51 (2007).

212. See *supra* notes 137–138 and accompanying text.

213. Charles E. Van Horn et al., *Effective Use of Re-Issues and Reexaminations in the United States*, CHINA IP NEWS (June 2009), <https://www.finnegan.com/en/insights/articles/effective-uses-of-reissues-and-reexaminations-in-the-united.html> (discussing strategic use of post-grant reexamination in litigation) [<https://perma.cc/39VR-XDR6>]; Kenneth R. Adamo, *Patent Reexamination*, 58 CHI.-KENT L. REV. 59, 78 (1981) (discussing the use of post-grant reissue and reexamination proceedings to strengthen presumptions of patent validity).

214. See Jonas Anderson, *Congress as a Catalyst of Patent Reform at the Federal Circuit*, 63 AM. UNIV. L. REV. 961 (2014); Dan L. Burk, *Patent Reform in the United States: Lessons Learned*, 35 REGULATION 20 (2013).

entific fraud.²¹⁵ In a similar vein, the degree of disconnection between social coherence and the legal structures that encourage social coherence helps explain the sense of fraud or outrage that accompanies the strategy of patent “trolling.” Such “trolls” or “patent assertion entities” accumulate patents and collect the associated rents without any intention of manufacturing a product covered by the patent claims.²¹⁶ Pure rent collection of this type has vehemently been disparaged as an illegitimate assertion of patent rights.²¹⁷ This stance is perhaps puzzling, since the standard trope regarding patents is that they are property, and collecting and licensing a portfolio of property is an established and fairly respectable business model, at least when the portfolio is populated with juridical entities that are regarded as sufficiently stable to constitute legitimate properties.²¹⁸ Houses, pastures, automobiles, and even financial securities are all routinely deployed to collect rents in this manner.

But recall our prior exploration of patents and property, not as a matter of liminality, but as a matter of coherence.²¹⁹ Complaints about trolling seem grounded in indignation over deployment of intermediate objects that no one fully accepts as a stable article. Often, the portfolio collected by the “troll” consists of incompletely or shoddily secured boxes, where the gaps and seams show.²²⁰ No one truly accepts such patents as coherent objects, but reopening even a leaky box is costly, and paying a threatening troll to go away is often less expensive than unravelling the basis for the asserted exclusive rights.²²¹ Indeed, in the United States, the time and expense of reopening the box became famously problematic, prompting Congress to institute new administrative procedures in the Patent Office, intended to allow the box to be reopened, and its contents examined, at a much lower cost.²²² Still, these procedures provided that the box could only be reopened at certain times, in certain ways, and in particular that subsidiary boxes in the patent’s network were to be left alone in the process. Boxes that endure such additional trials of strength may be realigned, but more tightly sealed than ever.²²³

215. See *supra* note 182 and accompanying text.

216. Mark A. Lemley & Samantha Zyontz, *Does Alice Target Patent Trolls?*, 18 J. EMPIRICAL LEGAL STUD. 47 (2021). Christopher A. Cotropia et al., *Unpacking Patent Assertion Entities (PAES)*, 99 MINN. L. REV. 649 (2014); Michael Risch, *Patent Troll Myths*, 42 SETON HALL L. REV. 457 (2012).

217. See, e.g., Robert Merges, *After the Trolls: Patent Litigation as Ex Post Market-Making*, 54 AKRON L. REV. 555, 556–58 (2021); Mark A. Lemley & Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117 (2013); John R. Allison et al., *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1 (2009).

218. Burk, *Sociology*, *supra* note 6, at 446–47.

219. See *supra* notes 42–44 and accompanying text.

220. See Robert P. Merges, *The Trouble with Trolls: Innovation, Rent Seeking, and Patent Law Reform*, 24 BERKELEY TECH. L.J. 1583, 1588 (2009).

221. See Lemley & Melamed, *supra* note 217, at 2126 (describing the business strategy of “bottom-feeder” trolls).

222. See Burk, *supra* note 214 (describing administrative processes added under the America Invents Act).

223. See *supra* notes 204–209 and accompanying text.

Whatever the political or legal significance of such subsequent proceedings may be, the significance to patents in action is that the action by no means ends at issue from the Patent Office. Rather, the invention that emerges from post-issue reviews or from subsequent litigation may not be the same invention that emerged from prosecution before the Patent Office. Keeping the lid on the patent box in the face of such post-grant pressures may require shoring up the seams and reconfiguring the array of supporting allies. In certain proceedings, this happens openly, as the patent box defender may have an opportunity to once again amend claims, changing the semantic shape of the invention.²²⁴ In other contexts, the shifts may be less apparent. Judges are charged with interpreting the language of the claims,²²⁵ a process that may also realign the contours of the box. New allies may be recruited and introduced as evidence to support closure; old allies may be subverted or pruned from the supporting network.



Patents do not seem to prompt the behavior we expect.²²⁶ But we might say that the current debate over the social utility of patents is in many ways reminiscent of the false particle/wave duality paradox debated so vociferously in early twentieth-century physics. Physicists found that electrons and other subatomic entities would sometimes manifest experimental outcomes characteristic of constituting a particle, and other times would manifest experimental outcomes characteristic of constituting a wave.²²⁷ This seeming divergence in results led to enormous confusion and frustration that electrons did not seem to be either one or the other, but would instead mercurially slip back and forth between the two.²²⁸ The problem of course was not with the electrons. Electrons may not always behave exactly like particles, and they may not always behave exactly like waves. But they *do* always behave *exactly* like electrons.²²⁹ That the comportment of electrons is analogically inconvenient indicates a problem with the analogies, not with the phenomenon.

In much the same fashion, the observed character of patent practices may often seem incongruous with the expectations of abstract or theoretical policy prescriptions. These prescriptions anticipate patent characteristics that advance a disclosure policy, or that advance an investment incentive policy.²³⁰ However,

224. 35 U.S.C. § 316(d)(1) (allowing substitution of claims in *inter partes* review).

225. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 382–83 (1996).

226. Lemley, *supra* note 4, at 14; Mark A. Lemley, *Faith-Based Intellectual Property*, 62 UCLA L. REV. 1328, 1339 (2015).

227. Niels Bohr, *The Quantum Postulate and Recent Development of Atomic Theory*, 121 NATURE 580 (1928).

228. MANJIT KUMAR, QUANTUM: EINSTEIN, BOHR, AND THE GREAT DEBATE ABOUT THE NATURE OF REALITY 242–43 (2011).

229. See JACOB BRONOWSKI, *The Principle of Tolerance, in A SENSE OF THE FUTURE* 221, 229 (Piero E. Ariotti & Rita Bronowski eds., 1977) (“And you have to keep on saying to yourself all the time, ‘Now do not bore me with when the electron is a particle and when it is a wave. An electron is just an electron.’ You shake it by the hand and then you watch its behavior.”).

230. See *supra* notes 16–17 and accompanying text.

it seems clear—based on the thousands and thousands of erudite scholarly pages critiquing patents—that the performance of patents in action is manifestly inconsistent with incentive theories, and even less consistent with disclosure theories. But they are nonetheless entirely *consistent with whatever uses people are actually putting them to*, and with the shapes patents are given in the course of their construction. The question to be answered is what such shapes actually are. This is not to say that the actual set of practices surrounding patents is necessarily beneficial, nor is it to say that it is detrimental. We are not far enough along in understanding how patents are actually behaving to say one way or the other. But rather than a problem to be corrected, departures of patent practice from policy prescription are an opportunity to discover how patents are actually used.²³¹

What then do we see when we follow patents in action? What we observe is the construction of a social artifact that shares certain formative characteristics with technical publications, but departs substantially in many other respects. The patent system has adopted certain strategies characteristic of scientific literature, such as the exclusion of readers, the recruitment of citational allies, the association with prior blackboxed “facts,” and the arrangement of such resources to close off dissent. At the same time, patents employ their own distinctive strategies for settling controversies and reaching closure—for example the imposition of presumptions of utility and enablement for applications, presumptions of validity for issued patents, and other deployments of legal process to shore up the stability of the patent object.

The distinctive deployment of legal resources to stabilize the patent object makes the patent an unreliable ally in building a network of technical support. The closure achieved by paper patenting, by prophetic examples, and by constructive reduction to practice might well come unraveled when poked and prodded in the conceptual crucible of peer review or in the material trials of the laboratory. But there is no realistic prospect that such trials of empirical strength will ever become a component of patent certification (despite various quixotic academic proposals advocating such practices).²³² There the patent document and the technical document part company. To say that both the scientific paper and the patent communicate with scientists, or that both disclose technical information, is much like saying that both the sportscar and the minivan provide transportation, or that both have wheels. While the statements of similarity are not wrong, neither is suited to the purposes of the other—the sportscar is poorly adapted to family outings and the minivan is poorly adapted to drag racing.

By following the action in the patent system, we are instead forced to conclude that the networks assembled around patent objects show little evidence of adaptation to any “teaching function.” Neither is there much evidence of adaptation to provide incentives, in the sense of providing assurances that the object passing through the patent system meets the legal criteria of patentability. This is not to say that patents might never be deployed for such purposes; as we have

231. See Burk, *Calculative Patents*, *supra* note 6, at 184.

232. See *e.g.*, Seymore, *supra* note 13; Cotropia, *supra* note 162.

seen, they might be read to extract some technical information, or provide incentives in some cases. One might well pile the entire family into a sportscar or race the minivan. One should simply not be surprised if neither is optimized for such performance, or if the outcome of such antics seems disappointing.

So too with patents. We should not be surprised—as numerous commentators seem to be—if they perform poorly in situations for which there is little evidence that they are adapted. There is, however, copious evidence, which we have seen in this study, that what the patent system is superbly adapted to do is to *produce patents*. This conclusion is by no means a tautology or recursion. The black boxes, the new objects, created in the patent system become things,²³³ and as their Latin legal designation *res* implies, they are constructed to *resist* dissolution—nothing more and nothing less.²³⁴ Those black boxes may perhaps become allies in the construction of further social objects in other social processes—perhaps to the construction of licensing arrangements, or of markets, or of reputational capital²³⁵—but such processes are separate from and subsequent to the formation of patents in action.

233. See LATOUR, *supra* note 1, at 91 (“New objects become **things** . . . things with a name that now seem independent from the trials in which they proved their mettle.”); see also Madison, *supra* note 20, at 381–83 (discussing the Roman designation *res* as a “legal thing”).

234. See LATOUR, *supra* note 1, at 87, 93.

235. See *supra* note 7 and sources cited therein.