

The Central Claiming Renaissance

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THE CENTRAL CLAIMING RENAISSANCE

Andres Sawicki[†]

The Supreme Court has recently reinvigorated the law of patentable subject matter. But beneath the headlines proclaiming the return of limits to patent eligibility, a more profound shift has taken place: central claiming is reborn.

The Court's eligibility cases are significant outliers compared to today's run-of-the-mill patent law because claim language plays little role in their analyses. In our modern peripheral claiming system, the claim language is the near-exclusive guide to the patent's boundaries. But in its earliest days, our patent system pursued a central claiming approach, in which the inventor's actual work determined the patent's scope. The Court's eligibility cases focus on the inventor's actual contribution to the field, precisely as a central claiming inquiry would. And they can be better understood once this return to central claiming is revealed.

Indeed, the shift to central claiming points the way toward a principled approach to eligibility. The eligibility requirement aims to prevent patents from covering certain kinds of prohibited subject matter: laws of nature, natural phenomena, and abstract ideas. But every invention, at some level of abstraction, applies ineligible subject matter. In a peripheral claiming system, this levels-of-abstraction problem could lead courts to simply deem all claims eligible (as occurred for nearly thirty years) or all claims ineligible (as some fear will happen today). Central claiming offers a solution by focusing on what the inventor added to the storehouse of knowledge. It is that con-

† Associate Professor, University of Miami School of Law. For superb comments and conversations, I would like to express my gratitude to Jonas Anderson, Christopher Beauchamp, Bernard Chao, Andrew Dawson, John Duffy, Patrick Gudridge, Paul Gugliuzza, Tim Holbrook, Osamudia James, Dmitry Karshtedt, Lili Levi, Laura Pedraza-Fariña, W. Nicholson Price, Jason Rantanen, Daniel Ravicher, Greg Reilly, and Alexandra Roberts, as well as participants at the 2017 JIPSA Workshop at The Ohio State University, the IP Scholars Conference 2017 at Cardozo Law School, and the Vanderbilt IP Scholars Roundtable IV. For excellent research assistance, I thank Colby Barton, Stephanie Erickson, and James Valencia. Many thanks to the editors of the *Cornell Law Review*, whose comments and suggestions did much to improve the finished product. This Article also owes a significant debt to the Honorable Robert D. Sack, who emphasized for me the value in trying to read opinions in the best possible light. Finally, I could not have written this without the support of my wife, Jessica, who was central in motivating the work that went into it.

tribution, rather than some abstraction from the claim language, that guides the eligibility analysis.

There are several additional payoffs to uncovering the Court's return to central claiming. It helps make sense of the Court's eligibility jurisprudence, revealing two distinct threads in the cases—one focusing on ineligible contributions and another on implausible contributions—with distinct (though uneasy) normative foundations. More robust use of central claiming might also improve other areas of patent law. As a proof of concept, I show that it could provide a better approach to the exhaustion trigger, improve the law of divided infringement, and rehabilitate the written description requirement. These examples illustrate the potential of the central claiming renaissance.

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INTRODUCTION

The Supreme Court has recently reinvigorated the long-dormant law of patentable subject matter. In a quartet of cases—*Bilski v. Kappos*,¹ *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,² *Association for Molecular Pathology v. Myriad Genetics, Inc.*,³ and *Alice Corp. v. CLS Bank International*⁴—the Court transformed what had been a dead letter into the primary test of a patent’s validity.⁵ These cases have attracted voluminous attention.⁶ But existing scholarship has missed perhaps the most important implication of the Court’s efforts: central claiming is reborn.

The consensus view is that the Court’s eligibility jurisprudence is impenetrable.⁷ Most scholars contend that the cases are incoherent because of underlying conflicts about the normative goals of patentable subject matter or unresolved empirical questions about the effects of patents in particular industries. The premise is that if we could just agree on an underlying normative theory, or detect the actual impacts of patents, we would have a comprehensible eligibility doctrine.⁸

¹ 561 U.S. 593 (2010).

² 566 U.S. 66 (2012).

³ 133 S. Ct. 2107 (2013).

⁴ 134 S. Ct. 2347 (2014).

⁵ See Christopher M. Holman, *Patent Eligibility Post-Myriad: A Reinvigorated Judicial Wildcard of Uncertain Effect*, 82 GEO. WASH. L. REV. 1796, 1797–99 (2014). These cases focus on utility patents, setting design patents aside for the moment, and this Article follows suit.

⁶ See Timothy R. Holbrook, *The Supreme Court’s Quiet Revolution in Induced Patent Infringement*, 91 NOTRE DAME L. REV. 1007, 1007–08 (2016) (noting that of the Court’s past decade’s worth of patent cases, its pronouncements on eligibility have “garnered [the] most attention and commentary”). For an introduction to the literature, see Symposium, *Cracking the Code: Ongoing Section 101 Patentability Concerns in Biotechnology and Computer Software*, 82 GEO. WASH. L. REV. 1751 (2014); Symposium, *The Future of Patents: Bilski and Beyond*, 63 STAN. L. REV. 1245 (2011); Symposium, *The Meaning of Myriad*, 5 U.C. IRVINE L. REV. 973 (2015).

⁷ See, e.g., John M. Golden, *Flook Says One Thing, Diehr Says Another: A Need for Housecleaning in the Law of Patentable Subject Matter*, 82 GEO. WASH. L. REV. 1765, 1770 (2014) (“Since the Supreme Court issued its *Bilski* decision in 2010, the law of subject-matter eligibility has plunged into a seemingly ever widening maelstrom of uncertainty.”).

⁸ See Mark A. Lemley, Michael Risch, Ted Sichelman & R. Polk Wagner, *Life After Bilski*, 63 STAN. L. REV. 1315, 1328 (2011) (“[I]n order to appropriately apply the [patentable subject matter] exceptions, one must first understand their theory and the particular policy problem they are addressing.”); see also Tun-Jen Chiang, *Competing Visions of Patentable Subject Matter*, 82 GEO. WASH. L. REV. 1858, 1873–85 (2014) (arguing that doctrinal incoherence in patentable subject matter stems from a refusal to recognize the noneconomic normative aims of patentable subject matter rules); John F. Duffy, *Rules and Standards on the Forefront of Patentability*, 51 WM. & MARY L. REV. 609, 617–20 (2009) (arguing that uncertainty

Meanwhile, a minority of commentators view the problem as lying primarily in the Court's explicit pronouncements regarding the contours of patentable subject matter doctrine.⁹ This minority is correct, up to a point. The problem is doctrinal, and it demands a doctrinal solution. But the problem lies not in patentable subject matter itself.

Instead, the problem lies in how the Court has identified the invention to which the patentable subject matter requirement applies.¹⁰ Modern patent law is dominated by peripheral claiming, which defines the invention according to the language in the patent's claims.¹¹ The patentee's rights extend as far as the language a lawyer used to draft those claims, almost

regarding "the extent to which the potentially positive effects of patents are outweighed by their potential negative effects" has created "instability" in patentable subject matter law); Anna B. Laakmann, *An Explicit Policy Lever for Patent Scope*, 19 MICH. TELECOMM. & TECH. L. REV. 43, 47, 72 (2012) (arguing that if patent law "exists to further utilitarian goals," then "the central inquiry should be what scope of patent protection (if any) is required to promote the creation and development of the relevant technology"); Amy L. Landers, *Patentable Subject Matter as a Policy Driver*, 53 HOUS. L. REV. 505, 544-46 (2015) (arguing that considering "creative, economic, and social factors in making the patentability determination" will increase certainty in patentable subject matter jurisprudence). See generally Joshua D. Sarnoff, *Patent-Eligible Inventions After Bilski: History and Theory*, 63 HASTINGS L.J. 53 (2011) (providing a historical, utilitarian, and normative foundation for eligibility).

⁹ See, e.g., Jeffrey A. Lefstin, *The Three Faces of Prometheus: A Post-Alice Jurisprudence of Abstractions*, 16 N.C. J.L. & TECH. 647, 650 (2015) ("The major obstacle to consistency and predictability in the field is the incoherence of the Supreme Court's opinions."); Peter S. Menell, *Forty Years of Wondering in the Wilderness and No Closer to the Promised Land: Bilski's Superficial Textualism and the Missed Opportunity to Return Patent Law to Its Technology Mooring*, 63 STAN. L. REV. 1289, 1308 (2011) (suggesting that the solution to incoherent eligibility doctrine "requires courts to integrate the constitutional and jurisprudential traditions surrounding patentable subject matter with statutory construction principles and forthright recognition of the challenges of applying historic doctrines to unforeseeable technological developments").

¹⁰ The closest existing analysis is Bernard Chao, *Moderating Mayo*, 107 NW. U. L. REV. COLLOQUY 82 (2012). Chao argues that *Mayo* imperfectly adopted a point of novelty approach, emphasizing the claim elements that distinguish the claimed invention from the prior art. *Id.* at 91-94. Although I agree that this is the most plausible interpretation of Step Two, it does not accurately capture the Court's approach at Step One, and accordingly cannot illuminate the Court's patentable subject matter jurisprudence more generally, the way a central claiming understanding can. See *infra* text accompanying notes 110-60.

¹¹ See Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1744 (2009) ("In modern American patent doctrine, we define what the patentee owns not by what she actually built or disclosed, but by what she *claimed*."); Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 731-35 (2009).

no matter what the inventor actually did to merit the patent in the first place.¹²

But the Court's eligibility jurisprudence does not use patent law's standard peripheral claiming methodology; instead, it starts with a central claiming perspective. Central claiming approaches, which prevailed at the dawn of the patent system but have been in retreat for well over a century, measure the scope of the patent by the contribution the inventor made to the art.¹³ While the claim language plays some role in the central claiming analysis, the description of the invention in the patent's specification plays a much larger one. And it is the specification's thorough explanation of what the inventor did—not just the language used in the claims at the end of the patent—that is the focus of the patentable subject matter inquiry.

The Court's cases have coalesced around a two-step framework for assessing eligibility.¹⁴ Step One asks whether the claim is "directed to" one of three categories of ineligible subject matter: laws of nature, natural phenomena, or abstract ideas.¹⁵ If so, then Step Two demands that the claim include "an inventive concept," ensuring that it "amounts to significantly more than a patent upon the ineligible concept itself."¹⁶ Viewing these cases through a central claiming lens reveals that the implicit object of the Step One analysis is the inventor's contribution. And this is fundamentally a central claiming inquiry—the Court determines whether the eligibility requirement is satisfied by reviewing the specification for an understanding of the inventor's contribution to the art.

¹² See Burk & Lemley, *supra* note 11, at 1749; Fromer, *supra* note 11, at 734–35. Note that in this context, "what the inventor actually did" may be more precisely understood as "what the inventor said she actually did, as described in the specification." Thus, inventors may include prophetic examples in their specifications describing what would happen were their inventions actually practiced, even if they themselves didn't practice them. See *Gould v. Quigg*, 822 F.2d 1074, 1078 (Fed. Cir. 1987). More generally, there are thorny questions regarding courts' ability to rely on evidence outside the patent in understanding just what it is that the inventor claims. See *infra* text accompanying notes 228–29. The point here is simply that the goal of the modern peripheral claiming regime is to understand how a person of ordinary skill would understand the words of the claims, rather than to understand what the inventor (asserts she) has added to the field.

¹³ See J. Jonas Anderson & Peter S. Menell, *Informal Deference: A Historical, Empirical, and Normative Analysis of Patent Claim Construction*, 108 *Nw. U. L. Rev.* 1, 15 (2014).

¹⁴ This framework was initially developed in *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012) and subsequently formalized in *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014).

¹⁵ *Alice Corp.*, 134 S. Ct. at 2355.

¹⁶ *Id.* (internal quotation marks and citations omitted).

Recognizing this turn to central claiming has several payoffs. It improves our understanding of existing law and offers new opportunities for solving old problems. I focus first on the doctrinal and normative implications for patentable subject matter itself because this is where central claiming has had its most immediate influence.

The central claiming insight allows us to distinguish two doctrinal threads in the Court's jurisprudence, with distinct normative foundations. The first thread, exemplified by *Alice* and *Bilski*, comprises scenarios in which the inventor cannot provide a plausible description of the contribution she made to the art.¹⁷ This implausible-contributions thread is analogous to civil procedure's *Twiqbal* plausibility pleading standard. *Twiqbal* asks judges for a commonsense assessment of whether the allegations in a complaint are sufficiently plausible to merit the expense of discovery;¹⁸ in much the same way, the *Alice* and *Bilski* thread asks judges for a commonsense assessment of whether the inventor's description of her contribution to the art is sufficiently plausible to merit the expense of measuring its compliance with more demanding validity doctrines.

This approach holds some promise.¹⁹ It could cheaply weed out claims that are, on their face, transparent attempts to obtain patent rights to things that the putative inventor did not herself invent. Nevertheless, the normative case for this thread is uneasy because judges may prove incapable of making cheap and accurate assessments of plausibility over the wide range of technological fields in which inventors seek patents.

The second thread, exemplified by *Mayo* itself, comprises scenarios in which the inventor's contribution included the identification of ineligible subject matter.²⁰ The intuition driving this thread is that, when someone else previously disclosed the ineligible subject matter, patent law's newness rules—novelty and non-obviousness—will prevent a patent from providing practical exclusivity over the ineligible subject matter itself. Einstein's work would raise probably insurmountable novelty and non-obviousness bars to an inventor seeking a patent today that would provide her exclusivity over $E = mc^2$.

Conversely, when the inventor herself was the first to disclose the ineligible subject matter, the only effective barrier will

¹⁷ See *infra* subpart III.A.

¹⁸ See *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009); *Bell Atl. Corp. v. Twombly*, 550 U.S. 554, 570 (2007).

¹⁹ See *infra* section III.A.2.

²⁰ See *infra* subpart III.B.

be the patentable subject matter requirement itself. This is what it means for a patent to be “directed to” ineligible subject matter in the way that Step One cares about.²¹ Because in these scenarios, novelty and non-obviousness cannot prevent the patent’s scope from including things we want to keep out of the patent system, we need the increased scrutiny that Step Two provides.

The normative case for this thread parallels the first.²² That implausible-contributions thread aims to use eligibility to reject patents when it is the cheapest way to eliminate an undesirable patent. This ineligible-contributions thread aims to use novelty and non-obviousness to reject patents when those are the doctrines that can most easily do the work, but apply increased patentable subject matter scrutiny to patents for which novelty and non-obviousness will be ineffective bars. This normative justification is, however, also uneasy. Patentees may draft specifications that evade increased eligibility scrutiny, and it is unclear whether other rules—especially the enablement doctrine—will adequately police such evasion.

Importantly, central claiming can, and peripheral claiming cannot, provide information about the relative efficacy of different doctrines in preventing a patentee from obtaining exclusivity over ineligible subject matter.²³ Every invention, at some level of abstraction, applies a law of nature, natural phenomenon, or abstract idea.²⁴ Because the claim language does not describe the relationship between the invention and the ineligible subject matter it applies, we have to abstract away from the claim itself to discern that relationship. But there is no way to know how far we must abstract away. Peripheral claiming poses a challenging, and perhaps insurmountable, levels-of-abstraction problem for eligibility doctrine.

Until *Bilski*, this problem had been solved by applying an underinclusive rule: courts held that essentially no claim raised eligibility concerns.²⁵ A reinvigorated eligibility doctrine that continued to rely on peripheral claiming would run into an overinclusiveness problem. Because every claim is an applica-

²¹ See *infra* section III.B.1.

²² See *infra* section III.B.2.

²³ See *infra* subpart II.C.

²⁴ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012).

²⁵ See Holman, *supra* note 5, at 1802–05 (describing how the Court’s decisions in the early 1980s “laid the groundwork for a subsequent dramatic expansion in the recognized scope of patent-eligible subject matter”).

tion of ineligible subject matter, every claim would be at risk of ineligibility.

The Court's turn to central claiming is therefore a sensible—perhaps even necessary—corollary to its resuscitation of patentable subject matter restrictions. Central claiming provides a standards-like assessment of the scope of the patent, allowing courts to engage in more nuanced evaluations of the inventor's contribution.²⁶ This move can therefore be seen as another example of the evolution of rules into standards as a predictable problem associated with a rule—underinclusiveness in this case—makes its continued application intolerable.²⁷ From this perspective, we should expect that this turn to a standard will ultimately give way to a return to rules as courts seek shortcuts that allow them to economize on the decision costs associated with standards.

The Court's reliance on central claiming for eligibility purposes could also be the start of a radical reorientation of the patent system. So in addition to my more thorough analysis of the existing law of patentable subject matter, I also provide three illustrations of the potential for more widespread application of central claiming. First, the trigger for patent exhaustion has already shifted away from peripheral claiming; moving further along that path towards central claiming could render exhaustion a more effective tool to prevent opportunistic patentees from stretching patent law beyond its boundaries.²⁸ Second, the Court has expressed interest in revisiting existing law on divided infringement, and I sketch out how a central claiming approach might more sensibly deal with that problem.²⁹ Finally, the long-criticized written description doctrine—a redundant requirement in a peripheral claiming system—can be rehabilitated as part of a more general turn toward central claiming.³⁰

This Article proceeds as follows. Part I first describes the differences between central and peripheral claiming. It then identifies problems in the Court's recent reinvigoration of the

²⁶ See Burk & Lemley, *supra* note 11, at 1777–83 (analogizing the choice between peripheral and central claiming to the more general choice between rules and standards).

²⁷ See *id.* at 1779–81; Carol M. Rose, *Crystals and Mud in Property Law*, 40 STAN. L. REV. 577, 580–90 (1988); Pierre Schlag, *Rules and Standards*, 33 UCLA L. REV. 379, 428–29 (1985) (explaining how rules evolve into standards, and standards subsequently evolve into rules).

²⁸ See *infra* subpart IV.A.

²⁹ See *infra* subpart IV.B.

³⁰ See *infra* subpart IV.C.

patentable subject matter requirement. Part II demonstrates that a central claiming analysis is at the heart of the Court's jurisprudence in this area and provides the normative case for the Court's move. Part III then uses a central claiming lens to clarify otherwise confusing aspects of patentable subject matter. Part IV illustrates the promise that central claiming holds for other difficult challenges in the patent system. Part V concludes.

I

THE SEARCH FOR ELIGIBLE INVENTIONS

This Part sets the stage for the Article's core contribution. I first describe the differences between peripheral and central claiming, and explain what is at stake in the choice between them. I then recount the recent history of patentable subject matter law, and introduce some of its problems. Readers familiar with both claiming methodology and the current state of patentable subject matter law may profitably skip ahead to Part II.

A. Two Approaches to the Invention

1. *Peripheral Versus Central Claiming*

Modern patents include both a specification and a set of claims.³¹ The specification is a description in words and drawings of what the invention is, how it works, what problems it aims to solve, and what distinguishes it from what came before.³² The claims are found at the end of the patent document; each one is a sentence-long articulation of precisely what

³¹ 35 U.S.C. § 112(a) (2012) (requiring "a written description of the invention"); 35 U.S.C. § 112(b) (2012) (providing that the "specification shall conclude with one or more claims"). Technically, the claims are part of the specification, but the term "specification" is often used to refer to the portion describing the invention in words and drawings, rather than the portion setting forth the legal boundaries. See, e.g., *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2125 (2014) (distinguishing between "the written specification" and the "separate section known as the 'claim'"); *General Foods Corp. v. Studiengesellschaft Kohle mbH*, 972 F.2d 1272, 1274 (Fed. Cir. 1992) (similar). I follow this common practice of using the term "specification" to refer to the narrative description of the invention as distinguished from the claims.

³² 35 U.S.C. § 112 (2012); 37 C.F.R. § 1.71 (2013); see also Christina Bohannan & Herbert Hovenkamp, *IP and Antitrust: Reformation and Harm*, 51 B.C. L. Rev. 905, 936 (2010) ("The written description in a patent typically describes the history of the art prior to this patent, the problems that the patent addresses, and the overall nature of the invention . . .").

it is that the inventor wants to prevent others from making, using, or selling.³³

In the case of a patent on a machine, for example, the specification would explain the kinds of things the machine could do, how to build it, and what makes it different from preexisting machines. Each claim would then describe the various parts of the machine and how they interact. But because it would do the patentee no good if the protected invention were limited to a particular specific version of the machine, the claims usually describe the invention at a fairly high level of abstraction. As a result, claim language transforms nails and screws into “fasteners”; laces and Velcro become “means for adjusting fit”; and a projector turns into “image generating means configured for generating an image presentable to the user on the display.”³⁴

The patent system needs some method for making sense of the claims and specification. For at least the past several decades, and perhaps for the past century or so, the dominant method has been what is called peripheral claiming.³⁵ In a peripheral claiming approach, a court uses the claim language to set an outer limit to the patent’s scope. The inventor’s rights extend to everything that falls inside that outer boundary; anything outside is beyond the inventor’s reach.³⁶

³³ See 35 U.S.C. § 112(b) (2012); *Nautilus*, 134 S. Ct. at 2129–30 (requiring that claims “inform those skilled in the art about the scope of the invention with reasonable certainty”); 1 DONALD S. CHISUM, CHISUM ON PATENTS § 8.06 (2016) (describing single-sentence format for claims).

³⁴ U.S. Patent No. 9,195,067 B1 col. 18, ll. 1-2 (filed Sept. 28, 2012).

³⁵ See Burk & Lemley, *supra* note 11, at 1748 (setting the 1870s as the date when patent law adopted peripheral claiming); Fromer, *supra* note 11, at 734–75 (concluding that “the requirement of peripheral claiming [today] looks much as it did in 1870”). I follow the common usage of “peripheral claiming” to describe the Federal Circuit’s current approach to claim interpretation methodology, in which the patent’s scope includes everything within the boundaries set by the claim language; I do so to maintain consistency with the most widespread understanding of that label, even though the Federal Circuit’s current approach might more accurately be viewed as a literalistic twist on traditional peripheral claiming approaches that prevailed until the Federal Circuit’s cases in the 1990s. See John F. Duffy, *Counterproductive Notice in Literalistic Versus Peripheral Claiming*, 96 B.U. L. REV. 1197, 1201–10 (2016).

³⁶ See Burk & Lemley, *supra* note 11, at 1744 (describing peripheral claiming as a system in which “patent claims . . . defin[e] the outer boundaries of a ‘property’ right conferred on the patentee”); Fromer, *supra* note 11, at 734 (explaining that in a peripheral claiming system, “[v]alidity and infringement [are] measured by construing the claim’s bounds and then determining whether particular embodiments fell within those bounds”). The “everything” there is actually controversial. See Duffy, *supra* note 35, at 1201–04 (contending that peripheral claiming does not require that the patentee’s rights extend to everything that falls within the claim’s scope, but only that the claim set the furthest possible limit).

Importantly, peripheral claiming at least downplays and perhaps even ignores what the inventor actually accomplished. The scope of the patentee's rights is defined simply by the words used in the claims.³⁷ And so, in a system dominated by peripheral claiming, disputes about patent rights frequently devolve into semantic disputes about the words in the claims, rather than technical disputes about the inventor's work.³⁸ In Judge Rich's famous phrase: "the name of the game is the claim."³⁹

For an example of the modern peripheral claiming approach, consider *Liebel-Flarsheim Co. v. Medrad, Inc.*⁴⁰ The patent there described a powered fluid injector, which is a medical device used to inject patients with fluids.⁴¹ The question was whether the invention included something called a pressure jacket. Although the claims did not explicitly mention this feature, the specification described the device as including a pressure jacket, which prevented the syringe from breaking during high-pressure fluid injection.⁴² The claims said one thing—there is no pressure jacket—and the specification said another—there is a pressure jacket. Because the Federal Circuit understood the invention to be whatever the claim said it was, rather than what the specification described as the inventor's actual contribution, the court concluded that the invention did not include a pressure jacket.⁴³

Perhaps it seems odd to conclude that the inventor's rights encompassed a version of the invention that the inventor herself explained would break. And the claim was ultimately invalidated precisely because it captured a version of the invention that would not work.⁴⁴ But this is just what a pe-

³⁷ See Mark A. Lemley, *Point of Novelty*, 105 NW. U. L. REV. 1253, 1256 (2011) ("Because the words of the claim, not what the patentee actually built, determines both whether the patent is valid and whether a defendant has infringed it, claim language has come to have talismanic significance in patent law.").

³⁸ See *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 384 (1996) (analogizing the task of construing a patent's reach to the task of interpreting other legal documents like deeds and contracts); *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015) (describing the possibility that in construing claim meaning, a court might have to "resolve[] a dispute between experts and make[] a factual finding that, in general, a certain term of art had a particular meaning to a person of ordinary skill in the art at the time of the invention").

³⁹ Giles S. Rich, *Extent of Protection and Interpretation of Claims—American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499 (1990).

⁴⁰ 358 F.3d 898 (Fed. Cir. 2004).

⁴¹ *Id.* at 900–01.

⁴² Without a pressure jacket, the syringe would not be able to withstand the high pressure it would be exposed to during injection process. *Id.*

⁴³ *Id.* at 903.

⁴⁴ *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1379 (Fed. Cir. 2007).

ripheral claiming approach demands: the scope of the patentee's rights is defined by the language of the claim, rather than a pragmatic assessment of what the inventor did.

Although peripheral claiming is the predominant approach in our modern patent system, we did not always rely on it. To the contrary, the earliest American patents did not have claims at all.⁴⁵ And even once claims became common, the patent system did not use them as the near exclusive basis for determining what the patent covered.⁴⁶

Instead, central claiming dominated. In this regime, rather than begin and (pretty much) end with the claim language, courts used both the specification and the claims to situate the inventor's work in the context of the technological field to understand just what it is that the inventor contributed.⁴⁷ The scope of protection was then calibrated to the inventor's contribution. If the inventor made a major advance over what was known at the time, the scope of protection expanded from the language of the claims to cover many variations; if the inventor made a trivial contribution, then the scope of protection contracted, perhaps so much that even embodiments falling within the literal words of the claims did not fall within the patentee's right to exclude.⁴⁸

For a classic example of central claiming, consider *Winans v. Denmead*.⁴⁹ The patent there covered a design for a coal car.

⁴⁵ For a thorough discussion of the historical evolution of claiming practices, see Anderson & Menell, *supra* note 13, at 8–21.

⁴⁶ Although claims became a required part of the patent document in 1836, see Patent Act of 1836, sec. 6, 5 Stat. 117, 119 (repealed 1952), courts continued to use a central claiming approach to ascertaining the patentee's rights, see Fromer, *supra* note 11, at 732–33. The rise of peripheral claiming is usually traced to the 1870 amendment to the patent statute demanding that a patent “particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery.” Act of July 8, 1870, sec. 26, 16 Stat. 198, 201; see *Union Water-Meter Co. v. Desper*, 101 U.S. 332, 337 (1879); *Merrill v. Yeomans*, 94 U.S. 568, 569–71 (1876); *Burk & Lemley*, *supra* note 11, at 1766–71; Fromer, *supra* note 11, at 734–35.

⁴⁷ Anderson & Menell, *supra* note 13, at 15 (“During the period when central claiming predominated . . . courts used claims as well as the specification to ascertain the patent's underlying inventive principle, which provided the baseline for evaluating whether the defendant[]” infringed.).

⁴⁸ This latter possibility is referred to as the reverse doctrine of equivalents, and is often characterized as a feature of central claiming regimes. See *Burk & Lemley*, *supra* note 11, at 1773 (identifying the origins of the reverse doctrine of equivalents in central claiming). These cases might alternatively be understood as non-literal peripheral claiming cases because the claims still define the outermost boundaries of the patentee's right to exclude. See Duffy, *supra* note 35, at 1205–06 (describing the reverse doctrine of equivalents as a required step in the infringement analysis conducted under traditional peripheral claiming).

⁴⁹ 56 U.S. (15 How.) 330 (1853); see Anderson & Menell, *supra* note 13, at 15.

Unlike prior rectangular coal cars, the claim in *Winans* was to a car “in the form of a frustum of a cone.”⁵⁰ (A frustum of a cone is a slice of a conical shape; imagine an ice cream cone with the bottom third cleanly cut off parallel to the top and you have the right idea.) The accused device was an octagonal car with sloping sides; more precisely, the accused car’s shape was a frustum of a pyramid. The question in *Winans* was whether the scope of the patent had to be limited to only *circular* conical ones—as the claim language “frustum of a cone” suggested—or instead could extend so as to cover *octagonal* coal cars with sloping sides.

The Court concluded that octagonal coal cars might be within the scope of the patentee’s rights, reasoning that a patent “cover[s] . . . not only the precise forms [the patentee] has described, but all other forms which embody his invention.”⁵¹ That is, the scope of the patent would not be limited to the particular embodiment described in the claim; instead, the scope would extend to cover other machines that incorporated “the substance of the invention.”⁵² Because the intuition underlying the invention was to distribute the “weight of the load . . . equally in all directions,” the claim could not be limited only to cars “in the form of the frustum of a cone.”⁵³ It could also include other shapes that distribute the “weight of the load . . . equally in all directions.”⁵⁴

This is precisely what a court in a central claiming regime should do. The words in the claims themselves were somewhat narrow, limited to coal cars with circular conical walls. But the court did not take the claims to mark some outer boundary of the invention, that boundary identified by ascertaining the meaning of the words “the form of the frustum of a cone.”⁵⁵ Instead, the court understood the claims to identify some core embodiment of the invention.⁵⁶ The boundary of the patentee’s right was then extended beyond that embodiment, its reach identified through a pragmatic analysis of what it was, exactly, that *Winans* actually did in the world, as described in the pat-

⁵⁰ *Winans*, 56 U.S. (15 How.) at 342.

⁵¹ *Id.*

⁵² *Id.* at 343.

⁵³ *Id.* at 342.

⁵⁴ *Id.* at 342–43. Whether an octagonal coal car in fact embodied this principle was a question left for the jury; the Court concluded only that the trial court had improperly taken this question away from the jury on the grounds that the claim could not, as a matter of law, cover anything other than circular coal cars. See *id.* at 344.

⁵⁵ See *id.* at 342–43.

⁵⁶ See *id.* at 343.

ent specification. The claim was accordingly understood to encompass a range of coal cars that captured the inventor's contribution: the realization that the distribution of the coal's weight placed too much and too uneven stress on a rectangular car with straight sides, and that this problem could be solved by building a (roughly) circular car with sloping sides.⁵⁷

Peripheral and central claiming represent two ends on a spectrum of potential approaches to identifying the invention, and the patent system has long incorporated elements of both.⁵⁸ Today, the methodology for ascertaining whether a claim is novel and whether an accused product literally infringes it are closest to the peripheral end, while the doctrine of equivalents is closest to the central end of the spectrum.⁵⁹ And courts occasionally still apply central claiming principles to resolve claim construction disputes.⁶⁰ Still, peripheral claiming has been ascendant since its introduction in the 1800s, and its dominance is now nearly complete.⁶¹

2. *Tradeoffs in Claim Interpretation*

The case for central claiming starts from the premise that the value of a patent ought to correspond to the value of the invention the inventor has contributed to society. Inventions (or at least the information underlying them) are public goods, so we offer patents as incentives for private actors to invest in their production and disclosure.⁶² At least to a first approximation, if an inventor produces a more valuable invention, she ought to receive a more valuable reward. This, in turn, will encourage subsequent inventors to direct their efforts to the inventions with the potential to produce the greatest value. To the extent that a central claiming approach aims first to under-

⁵⁷ See Burk & Lemley, *supra* note 11, at 1747 ("Whereas peripheral claiming purports to mark the outermost boundary of the patentee's claims, central claiming describes the core or gist of the patentee's contribution to technology.")

⁵⁸ See *id.* at 1771-74 (describing features of central claiming that survived the patent system's more general shift to peripheral claiming).

⁵⁹ See Fromer, *supra* note 11, at 735-38; see also Kevin Emerson Collins, *Getting into the "Spirit" of Innovative Things: Looking to Complementary and Substitute Properties to Shape Patent Protection for Improvements*, 26 BERKELEY TECH. L.J. 1217, 1303-12 (2011) (arguing that even classic peripheral claiming incorporates some features typically associated with central claiming).

⁶⁰ See, e.g., *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1304-05 (2011) (construing the claim term "body" to refer only to one-piece structures because, *inter alia*, the specification criticized prior products for not incorporating a "one piece outer body").

⁶¹ See Anderson & Menell, *supra* note 13, at 13-18.

⁶² See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 294 (2003).

stand what the inventor contributed, and then set the scope of the legal rights accordingly, it increases the concordance between the contribution and the reward. There are a number of complications to this simplified view of the patent system,⁶³ but the basic intuition suffices here.

The primary justification for peripheral claiming, meanwhile, is that it promises better public notice.⁶⁴ Interested individuals can read the words in a patent's claims, and use their understanding of those words to determine what the patent covers. There is no need for a sophisticated search for the substance of the inventor's contribution; knowledge of the English language will suffice. On this view, peripheral claiming reduces the "zone of uncertainty which enterprise and experimentation [would otherwise] enter only at the risk of infringement claims."⁶⁵ The choice between central and peripheral claiming is then primarily a choice between aligning patent scope with the inventor's contribution and providing the public with notice of prohibited activity.

But peripheral claiming has not kept its promise. Instead of the increased predictability that peripheral claiming ostensibly could provide, patent scope remains fundamentally uncertain.⁶⁶ However difficult it may be to discern the inventor's contribution, the semantic analysis of a word or phrase is often no less difficult, even in seemingly easy and straightforward

⁶³ See, e.g., Amy Kapczynski & Talha Syed, *The Continuum of Excludability and the Limits of Patents*, 122 YALE L.J. 1900, 1915–17 (2013) (explaining that the degree to which patents effectively exclude others will vary across inventions such that the relative pecuniary value of patents will not correlate with the social value of the underlying inventions).

⁶⁴ See Fromer, *supra* note 11, at 761–62 ("In fact, the switch from central to peripheral claiming in patent law has principally been defended as providing the public with better content notice of the set of protected embodiments.")

⁶⁵ *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014) (quoting *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942)).

⁶⁶ See Burk & Lemley, *supra* note 11, at 1745 ("The key feature of peripheral claiming, setting out clear boundaries to warn the public of what is and is not claimed—the 'notice function' of patents that has received so much attention in recent years—increasingly seems to be an illusion." (footnote omitted)). The notice problem in patent law has been extensively explored. See, e.g., JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK* 17–19 (2008) (arguing that inadequacy of notice provided by patents has led to rising patent litigation costs); DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* 28 (2009) (asserting that uncertainty in the nature and scope of patents will lead to more litigation); ADAM B. JAFFE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT* 171–72 (2004) (focusing on policies to reduce uncertainty as a way to reduce costly patent infringement claims).

cases.⁶⁷ Imagine a firm trying to determine whether a proposed product infringes a given patent. In a central claiming regime, the firm might be unsure whether its proposed product incorporates the inventor's core contribution; in a peripheral claiming regime, it would be similarly unsure whether the claim's use of the word "a" means "one and only one" or "one or more."⁶⁸

As a result, several scholars have argued that the patent system ought to at least partially move back to a central claiming regime.⁶⁹ Jeanne Fromer, for example, contends that central claiming might provide better notice than peripheral claiming because people categorize radially—that is, by extending outwards from a typical case to related cases—rather than by identifying the necessary and sufficient properties of the entire class.⁷⁰ Dan Burk and Mark Lemley argue that courts, as backward-looking institutions, would be better off

⁶⁷ See Christopher A. Cotropia, *What Is the "Invention"?*, 53 WM. & MARY L. REV. 1855, 1913 (2012) (arguing that in moving from an external invention-oriented approach to a claim-centered approach "the ambiguity shift[s] from questions of insubstantial differences to the meaning of claim terms that have multiple dictionary definitions"); Fromer, *supra* note 11, at 763 ("[P]eripheral claims' unpredictability relates to the interpretation of claim words, while for central claims, it relates to the extent and shape of similarity to the claimed embodiments.").

⁶⁸ Yes, really. See Burk & Lemley, *supra* note 11, at 1753. This exact ambiguity has been the source of more than one Federal Circuit opinion. See *Voda v. Cordis Corp.*, 536 F.3d 1311, 1319–22 (Fed. Cir. 2008); *N. Am. Vaccine, Inc. v. Am. Cyanamid Co.*, 7 F.3d 1571, 1575–77 (Fed. Cir. 1993). For over a dozen district and appellate court decisions on whether "a" should be given a singular or plural meaning, see CHISUM, *supra* note 33, § 6-18B, at nn.387–88. As Christopher Cotropia explains, the uncertainty associated with ascertaining an invention in a central claiming (which roughly corresponds to what he refers to as an external invention) regime flows from underlying policy-relevant questions about the appropriate degree of exclusivity to award a patentee; in a peripheral claiming regime, however, the uncertainty flows from arguably policy-irrelevant and perhaps superficially random reasons related to linguistic ambiguity. See Cotropia, *supra* note 67, at 1912–13.

⁶⁹ In a related vein, Oskar Liivak argues that the focus on the claim and disregard for the invention is unjustified in light of both the constitutional and statutory foundations of patent law. See Oskar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 SETON HALL L. REV. 1, 16–31 (2012). And Christopher Cotropia contends that patent law has lost its moorings in part because it uses an internal definition of the invention—focusing on the claim language—rather than an external one—focusing on what the inventor did in the world. See Cotropia, *supra* note 67, at 1891–905. While neither Liivak nor Cotropia frame their analyses in terms of central and peripheral claiming, their approaches have obvious parallels with the one described here.

⁷⁰ See Fromer, *supra* note 11, at 763–66. Central claiming might also reduce the costs associated with claim drafting to the extent that it demands less linguistic precision. See *id.* at 757–59. One potentially important disadvantage of central claiming is that it may be more difficult for the examiner to determine whether a claim satisfies the patentability requirements. See *id.* at 768.

with the flexibility that central claiming provides because it would allow them to transparently tailor patent scope to the circumstances of any given dispute; this would represent an improvement from the current situation, in which courts twist claim language to reach just results.⁷¹

Still, some scholars defend the peripheral claiming regime. Henry Smith, for example, asserts that a peripheral claiming approach is preferable because it requires an evaluation only of the boundaries of the right, rather than the entirety of the right, which is preferred in the light of the high delineation costs associated with novel technology.⁷² John Duffy takes an apparently middle position, arguing that the problems with the patent system are not a result of its reliance on a peripheral claiming methodology, which emphasizes the outer boundaries of the patentee's rights, but rather its excessively literalistic approach to ascertaining those boundaries.⁷³

Despite their differences, these scholars all agree on one thing: peripheral claiming dominates today's patent system.⁷⁴ While vestiges of the central claiming system remain, the consensus view is that the patent system relies primarily on peripheral claiming.⁷⁵ And this consensus may well have been correct in the recent past.

But it is no longer accurate. Over the past decade, the Supreme Court's patentable subject matter jurisprudence has resurrected central claiming, placing it at the very heart of the

⁷¹ See Burk & Lemley, *supra* note 11, at 1782–83.

⁷² See Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1807 (2007) (defending peripheral claiming because the “definition of claims focuses on the outer bounds of what is claimed as an invention, without the need to specify the interior”).

⁷³ See Duffy, *supra* note 35, at 1216–20 (concluding that a traditional peripheral approach would be preferable to the literalistic approach of the Federal Circuit in part because the literalistic approach has not “produced more certainty in property rights definition” and the traditional approach “would not undermine the certainty of the right’s core”).

⁷⁴ See Burk & Lemley, *supra* note 11, at 1770–74 (suggesting that the 1996 *Markman* decision turned “a hybrid peripheral-claiming system” into one that is almost purely peripheral); Duffy, *supra* note 35, at 1201–10 (describing the modern approach as a literalistic version of peripheral claiming); Fromer, *supra* note 11, at 731–35 (recounting the history of the shift from central to peripheral claiming); Smith, *supra* note 72, at 1807 (describing “today’s ‘peripheral’ approach” in patent law).

⁷⁵ The most prominent remnants are the doctrine of equivalents and means-plus-function claiming. See Burk & Lemley, *supra* note 11, at 1772–74. Scholars disagree whether the practice of dependent claiming should be understood as an element of central claiming in our modern system. Compare Fromer, *supra* note 11, at 739–40 (arguing that dependent claims “share traits with central claiming”), with Burk & Lemley, *supra* note 11, at 1746 n.15 (disputing Fromer’s characterization of dependent claims as “elements of central claiming”).

most important issue in patent law today: just what kinds of things can someone patent in the first place?

B. The Death and Birth of Patentable Subject Matter

The roots of patent eligibility are nominally found in 35 U.S.C. § 101, which permits anyone who “invents or discovers any new and useful process, machine, manufacture, or composition of matter” to “obtain a patent.”⁷⁶ This broad statutory language is typically qualified by three judicially-crafted exceptions: laws of nature, natural phenomena (also referred to as products of nature), and abstract ideas.⁷⁷ Although the Supreme Court often traces its historical pedigree back over a century, the modern law of patentable subject matter can more precisely find its origin in the wake of the 1952 Patent Act.⁷⁸ That is when the Court decided a trilogy of abstract ideas cases—*Gottschalk v. Benson*,⁷⁹ *Parker v. Flook*,⁸⁰ and *Diamond v. Diehr*⁸¹—that established the framework in which we operate today.

This trilogy, however, left a confusing legacy, with *Flook* and *Diehr* proving particularly vexing. Both cases involved the use of mathematical formulas to improve well-known chemical

⁷⁶ 35 U.S.C. § 101 (2012).

⁷⁷ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70 (2012). This has long been an area where caselaw predominates. See Duffy, *supra* note 8, at 621.

⁷⁸ See J. Jonas Anderson, *Applying Patent-Eligible Subject Matter Restrictions*, 17 VAND. J. ENT. & TECH. L. 267, 271–77 (2015). There are much older cases—dating back to the 1800s—that are now understood as patentable subject matter cases. See John M. Golden, *Patentable Subject Matter and Institutional Choice*, 89 TEX. L. REV. 1041, 1075 (2011) (“Chronicles of U.S. courts’ efforts to regulate subject-matter eligibility commonly start at least as early as the U.S. Supreme Court’s 1854 decision of *O’Reilly v. Morse*.”). But they fit uneasily in the modern framework because the patent system was so different then, lacking, for example, a statutory non-obviousness requirement. See *id.* at 1075–76; Holman, *supra* note 5, at 1800; Katherine J. Strandburg, *Much Ado About Preemption*, 50 HOUS. L. REV. 563, 569 n.16 (2012). Because there was some kind of patentable subject matter requirement, even if poorly developed or understood, it is not quite right to say that the patentable subject matter doctrine started after the 1952 Patent Act. See Jeffrey A. Lefstin, *Inventive Application: A History*, 67 FLA. L. REV. 565, 565 (2015). The post-1952 cases, however, appear to adopt a framework quite different from the pre-1952 ones, and the grounding of the current doctrine in Section 101 of the present statute (enacted as part of the 1952 Patent Act) suggests that there is a distinct, modern patentable subject matter doctrine. For this reason, I start with the major cases following the 1952 Patent Act, which, although it codified some pre-existing law, established the basic framework in which we operate today. See *id.* at 570.

⁷⁹ 409 U.S. 63 (1972).

⁸⁰ 437 U.S. 584 (1978).

⁸¹ 450 U.S. 175 (1981).

processes; but while the claims in *Flook* were held ineligible, those in *Diehr* survived.⁸² Nearly forty years later, scholars continue to contend that they are simply irreconcilable.⁸³

Rather than confront the tension between *Flook* and *Diehr*, subsequent decisions relied principally on the Supreme Court's next pronouncement on patentable subject matter: *Diamond v. Chakrabarty*.⁸⁴ Ananda Chakrabarty had discovered a way to add four plasmids—genetic material existing apart from chromosomal DNA—to a *Pseudomonas* bacterium.⁸⁵ Because *Pseudomonas* was a pre-existing genus of bacteria, and each of the four plasmids existed independently before Chakrabarty's work, the claim could plausibly be understood as covering nothing more than ineligible products of nature. Nevertheless, the Court concluded that Chakrabarty's claim satisfied the patentable subject matter requirement because it covered "a new bacterium with markedly different characteristics from any found in nature and one having the potential for significant utility."⁸⁶

Courts then largely ignored the irreconcilable results in *Benson*, *Flook*, and *Diehr* in favor of the simplicity of *Chakrabarty*.⁸⁷ The post-*Chakrabarty* era is neatly encapsulated by the Court's suggestion in that case that "anything under the sun that is made by man" is patentable.⁸⁸ Not coincidentally, the decades following *Chakrabarty* saw patents issued on everything from human genes to a method of buying junk on the internet with only one click.⁸⁹ In short, for nearly thirty years, the patentable subject matter question was answered simply "yes."

⁸² *Diehr*, 450 U.S. at 184; *Flook*, 437 U.S. at 594.

⁸³ See Chao, *supra* note 10, at 89 ("*Flook* and *Diehr* are simply irreconcilable."); Golden, *supra* note 7, at 1781.

⁸⁴ 447 U.S. 303 (1980).

⁸⁵ *Id.* at 305–06. Each of the four plasmids was able to break down a different component of oil, and the idea was to use *Pseudomonas* incorporating those plasmids to clean up oil spills. *Id.*

⁸⁶ *Id.* at 310.

⁸⁷ See John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. REV. 1139, 1160 (1999) (describing the state of eligibility doctrine in 1999 as "hardly an exaggeration to say that if you can name it, you can claim it").

⁸⁸ *Chakrabarty*, 447 U.S. at 309 (quoting Patent Law Codification and Revision: Hearings on H.R. 3760 Before Subcomm. No. 3 of the H. Comm. on the Judiciary, 82d Cong. 37 (1951) (statement of P.J. Federico, Examiner in Chief, United States Patent Office)).

⁸⁹ See, e.g., U.S. Patent No. 5,960,411 (issued Sept. 28, 1999) (claiming a method of purchasing goods on the internet with one click); U.S. Patent No. 5,747,282 (issued May 5, 1998) (claiming an isolated human gene).

This changed dramatically with a quartet of cases beginning in 2010: *Bilski v. Kappos*,⁹⁰ *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,⁹¹ *Association for Molecular Pathology v. Myriad Genetics, Inc.*,⁹² and *Alice Corp. v. CLS Bank International*.⁹³ In sharp contrast to the permissive practice that prevailed until then, the Supreme Court held claims ineligible in each of those cases, thereby reinvigorating what was thought to be a moribund doctrine.⁹⁴ The patentable subject matter doctrine now imposes real limits on what can be patented.⁹⁵ What those limits are, however, remains unclear.

C. Problems in the Subject Matter Revolution

There are some easy patentable subject matter cases: Shakespeare could not patent a sonnet, and Einstein could not patent $E = mc^2$; meanwhile, Eli Whitney could patent the cotton gin, and Thomas Edison could patent the phonograph.⁹⁶ Aside from those kinds of examples, though, commentators have struggled to make sense of the Court's patentable subject matter jurisprudence.⁹⁷

The emerging framework is a two-step inquiry, referred to as the *Mayo* or *Alice* test, after the cases that introduced and formalized it, respectively. At Step One, a court must "determine whether the claims at issue are directed to" a law of

⁹⁰ 561 U.S. 593 (2010).

⁹¹ 566 U.S. 66 (2012).

⁹² 569 U.S. 576 (2013).

⁹³ 134 S. Ct. 2347 (2014).

⁹⁴ See, e.g., Timothy R. Holbrook & Mark D. Janis, *Patent-Eligible Processes: An Audience Perspective*, 17 VAND. J. ENT. & TECH. L. 349, 350–51 (2015) (describing how "[n]early three decades of silent acquiescence" by the Supreme Court "gave way to five years of patent eligibility hysterics"). The Supreme Court's intervention in this area was perhaps foreshadowed by the Federal Circuit. See *In re Comiskey*, 554 F.3d 967 (Fed. Cir. 2009); *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007); see also Timothy R. Holbrook, *The Federal Circuit's Acquiescence(?)*, 66 AM. U. L. REV. 1061, 1075–80 (2017) (describing the at times tense relationship between the Supreme Court and the Federal Circuit in this era).

⁹⁵ See Michael Risch, *Nothing is Patentable*, 67 FLA. L. REV. FORUM 45, 45–51 (2015).

⁹⁶ See Lemley et al., *supra* note 8, at 1328 (characterizing patents on gravity or relativity as "the easy cases").

⁹⁷ See Holman, *supra* note 5, at 1822 ("Given the lack of clarity in the Court's patent eligibility decisions, there appears to be a strong consensus that the primary outcome of the Supreme Court's recent patent eligibility decisions has been increased confusion in the lower courts, the PTO, and the innovator community."); Lefstin, *supra* note 9, at 649–50 (noting that "there is now less clarity on the basic question of patent-eligibility than at almost any other time in American patent law" and that the "major obstacle to consistency and predictability in the field is the incoherence of the Supreme Court's opinions").

nature, natural phenomena, or abstract idea.⁹⁸ If not, then the claims are eligible and the inquiry is complete. But if the court concludes that the claims are directed to ineligible subject matter, then it proceeds to Step Two: “ask what else is there” in the claim elements that could “transform the nature of the claim into a patent-eligible application” of the ineligible subject matter.⁹⁹ This second step has also been called “a search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”¹⁰⁰ Each step presents its own difficulties.

Start with *Mayo* Step One. The inquiry here seeks to determine whether the invention is “directed to” ineligible subject matter. But, as the Court itself has recognized, “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.”¹⁰¹ And it cannot be that all inventions are “directed to” ineligible subject matter in the sense that Step One would care about; otherwise, we could just go straight to Step Two in every case. If there is a Step One asking whether the invention is “directed to” ineligible subject matter, then in some cases the answer has to be “no.”

So how close or what kind of a relationship does Step One look for between the invention and the prohibited categories? Consider (a caricature of) a claim to a hammer: “A device for striking objects comprising a handle and a head perpendicularly attached to said handle, wherein said head is heavier than said handle.” The hammer, of course, depends on Newton’s laws—if force didn’t equal mass times acceleration, the hammer wouldn’t work (or at least it wouldn’t work the way we know a hammer does work). And Newton’s laws are paradigmatic laws of nature.¹⁰² But it can’t be the case that the claim

⁹⁸ *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014).

⁹⁹ *Id.* (internal quotation marks and citations omitted).

¹⁰⁰ *Id.* (internal quotation marks and citations omitted).

¹⁰¹ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012); Chiang, *supra* note 8, at 1863–64 (“As a purely semantic matter, virtually every patent claim can be said to cover a ‘law of nature’ or ‘abstract idea,’ because no patent claim is limited to a fixed set of concrete physical embodiments—all patent claims are directed to an infinite set of objects that is defined by some principle, and it is always possible to characterize that defining principle as a ‘law of nature’ or ‘abstract idea.’” (footnote omitted)); Duffy, *supra* note 8, at 643 (recognizing that “inventors’ contributions . . . are all grounded in nature’s principles”); Lemley, *supra* note 37, at 1277 (“Indeed, most inventions at their heart involve a new application of some natural law or object.”).

¹⁰² See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980); *cf.* Golden, *supra* note 78, at 1079 (noting that “according to modern science, Newton’s theories are

to the hammer is “directed to” ineligible subject matter, such that it is patentable only if it also contains an “inventive concept.” Otherwise, all inventions would be “directed to” ineligible subject matter; the existence of a Step One inquiry independent of Step Two rejects that possibility.

Step Two presents as many complications as Step One. The fact that a claim is directed to ineligible subject matter is not fatal; to the contrary, applications of laws of nature, natural phenomena, and abstract ideas remain patent eligible.¹⁰³ The *Mayo* framework asks us to identify at Step Two an “inventive concept” that might transform an ineligible patent on excluded subject matter into a patent-eligible application of that excluded subject matter.¹⁰⁴

But what is an “inventive concept”? In *Alice*, for example, the claims were deemed to be directed to the abstract idea of intermediated settlement—that is, using a clearinghouse to reduce the risk that a counterparty to a transaction would not have the funds to complete the deal.¹⁰⁵ The Court concluded that the claims were ineligible because they “amount[ed] to ‘nothing significantly more’ than an instruction to apply the abstract idea of intermediated settlement using some unspecified, generic computer” and that this “is not ‘enough’ to transform an abstract idea into a patent-eligible invention.”¹⁰⁶ How much, though, is “enough”?¹⁰⁷ And “enough” of what?

not really laws of nature at all; they are no more than approximate descriptions or models”).

¹⁰³ *Mayo*, 566 U.S. at 71 (recognizing the three exceptions to patentable subject matter must have limits because “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas”).

¹⁰⁴ The Court has probably misconstrued earlier cases regarding the “inventive concept” requirement. See Lefstin, *supra* note 78, at 640–45 (explaining the history of the “inventive concept” and concluding that “it is equally clear that *Flook* and *Mayo* founded the inventive application test on a profoundly mistaken interpretation of *Neilson* and the other hot-blast cases”). I focus here on how the modern cases approach Step Two, even if it is built on a mistaken understanding of the historical roots.

¹⁰⁵ *Alice*, 134 S. Ct. at 2356.

¹⁰⁶ *Id.* at 2359–60.

¹⁰⁷ John Duffy, *Opinion Analysis: The Uncertain Expansion of Judge-Made Exceptions to Patentability*, SCOTUSBLOG (June 20, 2014, 12:46 PM), <http://www.scotusblog.com/2014/06/opinion-analysis-the-uncertain-expansion-of-judge-made-exceptions-to-patentability/> [<https://perma.cc/5LAT-5BWZ>] (“I’ll have to teach this ‘enough’ test next semester. I’ll be sure to use italics, just like the Court did, but I’m not convinced that even with the different font, the *enough* test will give much guidance to my students, or to the lawyers, judges and Patent Office officials who will have to apply it to numerous other situations.”).

Repeated references in *Mayo* and *Alice* to “conventional” or “well-understood” activity described by the ineligible claims in those cases suggest that the “inventive concept” demands that the inventor point to something unusual or surprising in her application of the prohibited subject matter.¹⁰⁸ But such a demand seems uncomfortably close to patent law’s novelty and non-obviousness requirements.¹⁰⁹ If we must determine, at the subject matter stage, whether the claim describes an unexpected or previously unknown element, then why should we also ask later whether the differences between the invention and the prior art would have been obvious to people working in the field?

Scholars have largely tried to solve these puzzles by resort to first principles. The premise is that if only we could identify the “right” normative theory of patentable subject matter, we could understand the contours of the existing doctrine.¹¹⁰ This search for first principles is, unfortunately, misguided. The problems of the Court’s patentable subject matter jurisprudence are not primarily normative problems—they are doctrinal ones. And they accordingly have doctrinal solutions. These solutions may well be unsatisfying or undesirable from a normative perspective. But before we can fix the normative

¹⁰⁸ See *Alice*, 134 S. Ct. at 2359 (reasoning that the claimed invention did not include an inventive concept because, *inter alia*, it simply recited “well-understood, routine, conventional activity” (internal quotation marks and brackets omitted)); *Mayo*, 566 U.S. at 79 (same).

¹⁰⁹ See Holbrook & Janis, *supra* note 94, at 379 (“It seems apparent from the passages in *Mayo* and *Alice* that the ‘inventive concept’ inquiry permits courts to undertake a quasi-Section 102 and 103 analysis for patentability over the prior art, without the need to qualify any single piece of evidence as prior art or consult the immense jurisprudence of Sections 102 or 103.”); Rebecca Eisenberg, *Symposium: Business Methods as “Abstract Ideas”—Explaining the Opacity of Alice and Bilski*, SCOTUSBLOG (June 23, 2014, 1:08 PM), <http://www.scotusblog.com/2014/06/symposium-business-methods-as-abstract-ideas-explaining-the-opacity-of-alice-and-bilski/> [<https://perma.cc/6FV6-26CA>] (criticizing the Court for “conflating the issue of patent eligibility with the distinct issue of patent worthiness”). The Court has recognized but dismissed this concern. See *Parker v. Flook*, 437 U.S. 584, 593 (1978) (“The obligation to determine what type of discovery is sought to be patented must precede the determination of whether that discovery is, in fact, new or obvious.”).

¹¹⁰ See Chiang, *supra* note 8, at 1873 (arguing “that the current PSM law and PSM debates cannot be intelligently understood without examining” the moral values at stake in patentable subject matter); Rebecca S. Eisenberg, *Wisdom of the Ages or Dead-Hand Control? Patentable Subject Matter for Diagnostic Methods After In re Bilski*, 3 CASE W. RES. J.L. TECH. & INTERNET 1, 7 (2012) (considering “alternative accounts of the work that patentable subject matter doctrine might do for the patent system in the hope of clarifying the application of that doctrine to diagnostic method claims”).

problems with the Court's jurisprudence, we need to understand just what it is that the cases require.

II

THE CENTRAL CLAIMING RENAISSANCE

To solve the puzzles of the Court's patentable subject matter jurisprudence, we must first understand how the Court is answering an antecedent doctrinal question: what is the invention to which the patentable subject matter requirements apply? The usual way courts identify the invention is to read the claim, and resolve disputes about how people in the field would understand it.¹¹¹ What the inventor actually did in the world, or how her alleged contribution compares to what preceded it—these things have almost nothing to do with how the modern patent system defines the invention.¹¹²

The Court's patentable subject matter jurisprudence is different. Some commentators have noticed that the Court is not doing what we think is supposed to happen in run-of-the-mill modern patent law—it sure doesn't look like the peripheral claiming approach we're used to.¹¹³ These commentators criticize the Court for adopting a "'shoot from the hip' mentality that deemphasizes the literal language of the claims."¹¹⁴ That critique would hit the mark if the Court were applying a standard peripheral claiming framework, in which the goal is to use the language of the claims to define the outer limits of the patentee's rights.

But that is not what the Court is doing. The doctrinal solution to patentable subject matter lies in recognizing the most important implication of the Court's recent eligibility cases: central claiming is reborn. In this Part, I will first show

¹¹¹ Llivak, *supra* note 69, at 11.

¹¹² *See id.* at 7 ("Because the claims define the invention, the invention itself has no substantive existence other than as a shorthand for the subject matter that a patentee can claim.").

¹¹³ *See* Holbrook & Janis, *supra* note 94, at 363–77 (describing problems with claim construction in eligibility jurisprudence); Lefstin, *supra* note 78, at 645–48 (arguing that the question "whether a claim embodies an inventive application of" ineligible subject matter is "an ill-formed question" in light of Judge Rich's paradigm that the "invention is the physical matter or steps defined by the claims and nothing more or less," and pointing to this as a source of tension between *Mayo* and the Federal Circuit's application of that case); *cf.* Golden, *supra* note 78, at 1059 (suggesting that "claim construction often need occur at only a crude, perhaps largely inchoate level in order to establish whether a claim passes the requirement of subject-matter eligibility").

¹¹⁴ Holman, *supra* note 5, at 1808; *see* Holbrook & Janis, *supra* note 94, at 364–66 (arguing that "the Court's recent eligibility jurisprudence offers no guidance on the relationship between eligibility analysis and claim construction").

that the Court uses a central claiming approach at Step One. I will then explore the Court's Step Two analysis; although it is not entirely clear, the Court is most likely applying an intermediate approach—known as point of novelty—at Step Two. Once we understand how the Court is identifying the invention, we can begin to answer some of the questions raised by its eligibility jurisprudence.

A. Central Claiming at Step One

Step One asks whether a claim is directed to ineligible subject matter. The Court has implicitly relied on a central claiming analysis to answer this question. This is most evident in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*¹¹⁵ Prometheus owned a patent describing a method for dealing with metabolic variation in patients taking thiopurine drugs.¹¹⁶ Its scientists developed the method after discovering the precise thresholds of thiopurine metabolites that correlated with the drug's efficacy and toxicity.¹¹⁷ The Court's treatment of Step One was brief; here's the whole thing:

Prometheus' patents set forth laws of nature—namely, relationships between concentrations of certain metabolites in the blood and the likelihood that a dosage of a thiopurine drug will prove ineffective or cause harm. Claim 1, for example, states that *if* the levels of 6-TG in the blood (of a patient who has taken a dose of a thiopurine drug) exceed about 400 pmol per 8×10^8 red blood cells, *then* the administered dose is likely to produce toxic side effects. While it takes a human action (the administration of a thiopurine drug) to trigger a manifestation of this relation in a particular person, the relation itself exists in principle apart from any human action. The relation is a consequence of the ways in which thiopurine compounds are metabolized by the body—entirely natural processes. And so a patent that simply describes that relation sets forth a natural law.¹¹⁸

The Court understood the claim as describing the “relationships between concentrations of certain metabolites in the blood and the likelihood that a dosage of a thiopurine drug will

¹¹⁵ 566 U.S. 66 (2012). The “directed to” formulation first arose in the *Alice* Court's discussion of *Mayo*. See *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo*, 566 U.S. at 76–78) (“First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts.”).

¹¹⁶ *Mayo*, 566 U.S. at 67–68.

¹¹⁷ *Id.* at 73–75.

¹¹⁸ *Id.* at 77.

prove ineffective or cause harm.”¹¹⁹ This understanding ignores language that would more narrowly circumscribe the patent’s reach in a peripheral claiming analysis. The claim recited actual steps that a human must perform—administering the drug and determining the metabolite levels—as well as a practical implication of the relationship between metabolites and drug toxicity or efficacy—that there is a need to adjust the dosage.¹²⁰ So why not characterize the claim as setting forth a process for guiding dosage decisions, incorporating those physical steps, rather than simply setting forth the underlying relationship?

The answer lies in the implicit object of the Step One inquiry: the inventor’s contribution to the field. Recall that Step One asks “whether the claims at issue are directed to one of [the] patent-ineligible concepts.”¹²¹ But the antecedent question is what are “the claims at issue . . . directed to.”¹²² That is, before we assess whether the underlying correlations are ineligible laws of nature, we need to determine whether the claims are “directed to” those correlations.

The *Mayo* Court answered this antecedent question by conducting a central claiming search for the inventor’s contribution. Based on its reading of the specification, the Court noted that other scientists had already identified the thiopurine metabolites responsible for therapeutic effects and toxicity.¹²³ What was missing were the precise metabolite thresholds that enabled doctors to determine whether a dosage of thiopurine was too high or too low for a particular patient.¹²⁴ And that is what the inventors provided—nothing more, but also nothing less.¹²⁵

That is why the Court characterized the representative claim as “stat[ing] that *if* the levels of 6-TG in the blood (of a patient who has taken a dose of a thiopurine drug) exceed about 400 pmol per 8x10⁸ red blood cells, *then* the administered dose is likely to produce toxic side effects.”¹²⁶ This is not

¹¹⁹ *Id.*

¹²⁰ *Id.* at 74–75.

¹²¹ *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014).

¹²² *Id.*

¹²³ *Mayo*, 566 U.S. at 74 (citing U.S. Patent No. 6,355,623 B2 col. 8 ll. 37–40 (filed Apr. 8, 1999)).

¹²⁴ *Id.*

¹²⁵ *Id.* (concluding that the patented process “embod[ie]d researchers’ findings that identified these correlations”—that is, the “precise correlations between metabolite levels and likely harm or ineffectiveness”—“with some precision”).

¹²⁶ *Id.* at 77.

what the claim actually said.¹²⁷ But it is an entirely sensible understanding of what the inventors added to the storehouse of knowledge: a precise description of the relationship between 6-TG levels and the probability of efficacy or toxicity. Because that relationship “exists in principle apart from any human action,” the claim was directed to a law of nature.¹²⁸ This use of the specification to determine what the inventors actually contributed is the hallmark of a central claiming approach.¹²⁹

It also contrasts with a peripheral claiming approach. Such an approach would have resolved disputes about the meanings of particular words that appeared in the claim, and used those meanings to set the boundary of the claim’s scope. The patentable subject matter inquiry would have then turned on whether things that fell within that boundary should have remained outside.

On a peripheral claiming approach, the Court may well have determined that the claim was not directed to a natural law. The claim recited, *inter alia*, “administering a [thiopurine] drug,” and “determining the level” of the metabolites.¹³⁰ Accepting *arguendo* the Court’s definition of a natural law as something “exist[ing] in principle apart from any human action,”¹³¹ each step could have been understood as limiting the patent’s scope to something other than the natural law itself because each step demanded some kind of human action: administering a drug and determining a metabolite level.

True, from a practical perspective, we couldn’t do the most useful thing we would want to do with the relationship—adjust dosage in response to patient-specific metabolic information—unless we performed the administering and determining steps. So there is a sense in which the claim might be understood as coextensive with the law of nature. But the metabolic process that gives rise to the relationship—that is, the natural law itself—could occur without infringing the patent; simply imagine a patient taking a thiopurine drug and never determining the metabolite levels. The level of metabolites in that patient’s body would in fact correlate with the

¹²⁷ See U.S. Patent No. 6,355,623 B2 col. 20 ll. 10–20 (filed Apr. 8, 1999).

¹²⁸ *Mayo*, 566 U.S. at 77.

¹²⁹ See Fromer, *supra* note 11, at 733–34 n.67 (arguing that *O’Reilly v. Morse* reflects central claiming principles because it relies on “the notion that the invention’s described embodiments and principles—rather than [its] claims . . . are central to the determination of the set of embodiments upon which the patent right operates”).

¹³⁰ U.S. Patent No. 6,355,623 B2 col. 20 ll. 10–15 (filed Apr. 8, 1999).

¹³¹ *Mayo*, 566 U.S. at 77.

drug's efficacy and toxicity, as the natural law dictates. Moreover, we could read or think about the natural law without administering the drug or determining metabolite levels. Researchers might then be able to use the law disclosed here to develop predictions about how the body might metabolize other, related substances.

A plausible view, if not the inevitable or even most persuasive one, is that none of these things would be within the scope of the claim under a peripheral claiming approach that sets the outer boundaries of the inventors' rights somewhere no further than a method incorporating both the administration of the drug and the determination of metabolite concentrations. It would have been possible on a peripheral claiming approach to understand the claim much more narrowly than the Court apparently did.

But at Step One, the Court did not attempt to identify the outer boundary of the patentee's rights by reference to the words of the claim.¹³² That the Court did not consider these possibilities suggests that whatever Step One requires a court to do, it does not need to conduct a peripheral claiming analysis to do it. Indeed, the words of the claim were almost entirely absent from the Step One analysis. That, in itself, is telling.

Simply put, *Mayo* is what a central claiming approach to Step One looks like. And that matters because it transforms the Court's analysis from a free-form, intuitive feel for whether the patent seems suspect into a central claiming analysis of patent scope.¹³³

Astute patent readers might contend here that whatever happens at Step One, the Court's patentable subject matter jurisprudence requires a peripheral claiming analysis at Step Two. As I will discuss momentarily, that view is probably incorrect, although I cannot quite rule it out. But even if it were correct, the point remains: central claiming has taken on a fundamental role in the patent system. *Mayo*—and the eligibility framework established in its wake—uses a central claiming approach to resolve the Step One question of whether claims are directed to ineligible subject matter. It is therefore a central

¹³² It is therefore inconsistent with the traditional peripheral claiming approach. See Duffy, *supra* note 35, at 1201–10.

¹³³ Cf. Holbrook & Janis, *supra* note 94, at 373 (contending that *Alice* “left the lower courts with nearly untrammelled discretion to embrace or ignore claim language in formulating their eligibility analyses”).

claiming analysis that determines whether an inventor has met the basic threshold of patent eligibility.¹³⁴

Nor is *Mayo* an isolated example. The last (for now) in the Court's patentable subject matter cases is *Alice Corp. v. CLS Bank International*.¹³⁵ *Alice* is a more challenging case because a central claiming approach turns on what the inventors contributed to the field, and it is unclear whether the *Alice* inventors contributed anything at all. Although the inventors in *Mayo* had at a minimum identified the precise metabolite thresholds at which thiopurine drugs become ineffective or toxic, it did not seem as though the inventors in *Alice* did anything other than patent something that people have been doing for millennia: using an intermediary to mitigate settlement risk. While the core of the claim in *Mayo* contained a natural law, the core of the claim in *Alice* was plausibly empty.

Still, *Alice* reflects central claiming principles. The claim recited, *inter alia*, "a computer-implemented scheme" using "a third-party intermediary" to mitigate "the risk that only one party to a financial transaction will pay what it owes."¹³⁶ Again, before deciding whether the thing that the claims were directed to was an abstract idea, the Court had to address the antecedent question—what were the claims directed to? The Court's answer: the claims were "drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk."¹³⁷

Focus again on the methodology the Court used to identify the invention that had to satisfy the subject matter inquiry. The Court made little effort to determine whether the claim language placed some outer limits on the scope of the inventor's rights. Had it done so, the Court might have concluded, for example, that the "exchange institutions" recited in the claims limited the patentee's rights to intermediated settlement among parties with bank accounts.¹³⁸ Or that the claims' reference to "supervisory institutions" required the establishment of particular specialized entities that performed only intermediated settlement work.¹³⁹ Or that the claims' requirement that settlement occur only at "end-of-day" or in chronological order limited their scope to transactions of a particular kind.¹⁴⁰

¹³⁴ See Chiang, *supra* note 8, at 1870–71.

¹³⁵ 134 S. Ct. 2347 (2014).

¹³⁶ *Id.* at 2351–52.

¹³⁷ *Id.* at 2356.

¹³⁸ See *id.* at 2352 n.2.

¹³⁹ See *id.*

¹⁴⁰ See *id.*

This is not to say that the Court was wrong about the claims being drawn to the concept of intermediated settlement. And it is not to say that, had the Court emphasized the meanings of “exchange institutions” or “supervisory institutions” or “end-of-day,” it would necessarily have arrived at the interpretations proposed above or concluded that the invention satisfied Step One, let alone Step Two. Nor is it to say that, if eligible, such a patent would satisfy the novelty and non-obviousness requirements: spoiler, it wouldn’t.

It simply demonstrates that the Court at Step One is not taking a peripheral claiming approach to the invention. Instead, the Court is first looking to the patent as a whole to ascertain just what it is that the inventors (assert they have) contributed.¹⁴¹ As does *Mayo*, then, *Alice* reflects the Court’s use of central claiming to answer the Step One “directed to” question. And although I will have more to say later about *Bilski* and *Myriad*—the remaining two cases in the Court’s recent subject matter quartet—suffice it to say for now that they are similar.¹⁴²

As an aside, it is worth asking whether this return to central claiming is intentional. The Court has not made an explicit reference to the choice between peripheral and central claiming in its eligibility jurisprudence. And we do not today have access to the Court’s internal deliberations.

Still, until its most recent quartet, the Court’s last foray into patentable subject matter began in the 1970s.¹⁴³ While those cases were decided well into the peripheral claiming era, they traced the roots of patentable subject matter doctrine back to a series of cases—*O’Reilly v. Morse*,¹⁴⁴ *Le Roy v. Tatham*,¹⁴⁵ and *Neilson v. Harford*¹⁴⁶—from the mid-1800s.¹⁴⁷ As

¹⁴¹ See *id.* at 2352 (quoting App. at 243, 248) (describing the invention in general terms as a method enabling parties to manage risk).

¹⁴² See *infra* text accompanying notes 184–90 (explaining that *Bilski* deemed the claim to be directed to the ineligible concept of hedging risk but the specification did not describe a plausible contribution to the art); *infra* text accompanying notes 268–96 (reconsidering *Myriad* as a Step Two inventive concept case).

¹⁴³ See Lefstin, *supra* note 78, at 573 (explaining that the Court did not address the issue of patent eligibility between *Diehr* and *Bilski*).

¹⁴⁴ 56 U.S. (15 How.) 62 (1853); see also Lemley et al., *supra* note 8, at 1332–33 (describing *Morse* as a patentable subject matter case notwithstanding arguments that it can be understood as an enablement case).

¹⁴⁵ 55 U.S. (14 How.) 156 (1852).

¹⁴⁶ 151 Eng. Rep. 1266 (1841).

¹⁴⁷ See *Parker v. Flook*, 437 U.S. 584, 592 (relying on the “landmark decision in” *Morse* and the rule from *Neilson* to invalidate the claim); *Gottschalk v. Benson*, 409 U.S. 63, 68 (beginning its eligibility analysis with a discussion of *Morse*); see also Christopher Beauchamp, *Patenting Nature: A Problem of History*, 16 *STAN.*

Jeffrey Lefstin has explained, the Court's 1970s cases appear to have built the substantive "inventive concept" requirement on a misreading of the substantive standards that *Morse*, *Le Roy*, and *Neilson* applied.¹⁴⁸ Similarly, those mid-1800s cases were applying a central claiming approach to the invention, rather than the peripheral claiming approach that prevailed in the 1970s.¹⁴⁹ The Court may have overlooked this difference in claim interpretation, and the Court's recently reignited interest in patentable subject matter may have then unwittingly revived those old cases' central claiming approach to understanding what a claim covers in the first place.¹⁵⁰ Whether intentional or otherwise, though, the upshot is that the Court's modern eligibility jurisprudence is built on a central claiming foundation.

B. The Step Two Puzzle

Turn now to Step Two. Recall that Step Two is "a search for an inventive concept" that would ensure that the inventor is not simply seeking a patent upon the ineligible subject matter itself.¹⁵¹ Even if Step One reflects central claiming principles, it is tempting to read Step Two as reflecting peripheral claiming principles.

This temptation arises because, while claim language is nearly irrelevant at Step One, it does make a difference at Step Two. For example, the *Mayo* Court at Step Two viewed the claimed invention as comprising three distinct steps, each corresponding to one of three actions identified in the claim language.¹⁵² And the Court explored whether the combination of

TECH. L. REV. 257, 261 (2013) (describing the importance and ambiguity of jurisprudence from the 1800s for patent law generally, and for patentable subject matter specifically).

¹⁴⁸ See generally Lefstin, *supra* note 78, at 623–45 (arguing that the inventive application requirement developed in *Funk Bros. Seed Co. v. Kalo Inoculant Co.* and *Parker v. Flook* is based on "a profoundly mistaken interpretation of *Neilson*").

¹⁴⁹ See Burk & Lemley, *supra* note 11, at 1748 (describing the consensus view that today's peripheral claiming system dates back to the late 1870s). Indeed, *Winans v. Denmead*, 56 U.S. (15 How.) 330 (1853), a classic example of central claiming, was decided by the Court the same year as *Morse* and *Le Roy*.

¹⁵⁰ See Beauchamp, *supra* note 147, at 262, 268–76 (describing the difficulty of "translating the older case law . . . into the modern doctrinal framework" in the context of patentable subject matter, and illustrating this challenge by tracing the roots of the products of nature doctrine).

¹⁵¹ *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) (internal quotation marks omitted).

¹⁵² *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 78–79 (2012).

steps might make some difference to its analysis.¹⁵³ *Mayo's* Step Two inquiry thus did not simply examine the nature of the inventors' contribution, as revealed in the specification; instead, it identified particular elements in the claim language, and assigned a specific meaning to each element. The *Alice* Court did the same.¹⁵⁴ So the particular way in which the claim is drafted has more significance at Step Two than it does at Step One.

Still, it would be a mistake to conclude that Step Two pursues modern peripheral claiming business as usual. Consider *Mayo's* analysis of the claim element "administering a drug providing 6-thioguanine to a subject having said immune-mediated gastrointestinal disorder."¹⁵⁵ Modern peripheral claiming would provide that this element identifies an outermost boundary of the claim's scope, set largely by the term "administering." Patent lawyers would argue about what that term means—maybe it means writing a prescription, maybe it requires making the drug, or maybe it is limited to thrice-daily administrations. A court would then resolve these ambiguities by deciding what a person of ordinary skill in the art would think the word "administering" means.

But there were no real disputes about what the word "administering" means, and the person of ordinary skill played no role in the Court's analysis of this step.¹⁵⁶ Instead, the Court reasoned that "the 'administering' step simply refers to the relevant audience, namely, doctors who treat patients with certain diseases with thiopurine drugs."¹⁵⁷ Whatever the word "administering" means, there is no plausible argument that it "simply refers to the relevant audience" from the perspective of a person of ordinary skill or anyone else. So this isn't the peripheral claiming approach we're used to.

¹⁵³ *Id.* at 79 ("[T]o consider the three steps as an ordered combination adds nothing to the laws of nature that is not already present when the steps are considered separately.").

¹⁵⁴ The *Alice* Court identified four distinct steps in the claimed method, and reasoned that the "claim elements separately" were insufficient to save the claims because the "function[s] performed . . . at each step" were "well-understood, routine, conventional activities." *Alice*, 134 S. Ct. at 2359 (internal quotation marks and brackets omitted).

¹⁵⁵ The Court's analysis of the "determining" step was similar. See *Mayo*, 132 S. Ct. at 1297–98.

¹⁵⁶ See *Holbrook & Janis*, *supra* note 94, at 363 ("[T]he hypothetical person having ordinary skill in the art[] has been accorded no place in the Supreme Court's modern eligibility cases.").

¹⁵⁷ *Mayo*, 566 U.S. at 78.

We might then ask whether the Court's approach at Step Two corresponds to what John Duffy calls traditional peripheral claiming. In his telling, traditional peripheral claiming is different from the prevailing literalistic approach, which is a fairly recent creation of the Federal Circuit.¹⁵⁸ The claim language marked the furthest extent of the patentee's rights, as peripheral claiming requires, long before the Federal Circuit was established in 1982.¹⁵⁹ But unlike the modern approach, once the outermost boundary was identified, a court in the pre-Federal Circuit era would turn to the specification to determine whether the inventor's contribution was more limited than the apparent reach of the claim language. If so, then the patentee's rights retreated from the outermost boundary to cover only that narrower contribution.¹⁶⁰

As traditional peripheral claiming requires, the Step Two analysis takes the claim language as its starting point—in *Mayo*, Step Two begins by identifying the three steps reflected in the words and structure of the claim.¹⁶¹ And, as in traditional (but unlike modern, Federal Circuit style) peripheral claiming, Step Two then adjusts the scope of the claim language in light of the inventor's contribution—the *Mayo* Court's analysis of the “administering” step is focused on that step's relationship to what was known in the field before the inventor's work.¹⁶²

But Step Two does not comport with a key feature of traditional peripheral claiming. In traditional peripheral claiming, the claim's scope can only *retreat* from the outermost boundary set by its language. Step Two, however, appears to extend a claim's scope *beyond* the reach of its language.

Thus, in *Mayo*, a traditional peripheral claiming approach might have limited the claimed invention's first step to particu-

¹⁵⁸ See Duffy, *supra* note 35, at 1201 (arguing that the Federal Circuit has developed a literalistic approach to claiming distinct from the peripheral approach “practiced throughout most of the twentieth century”).

¹⁵⁹ See *id.* at 1202 (“Peripheral definition . . . involves marking out the periphery or boundary of the area covered by the claim and holding as infringements only such constructions as lie within that area.” (internal quotation marks omitted) (quoting RIDSDALE ELLIS, PATENT CLAIMS § 4, at 4 (1949))).

¹⁶⁰ See *id.* at 1203 (explaining that the general consensus in the mid-1900s was that the peripheral claiming approach narrowed claims). While today we would call this something like a reverse doctrine of equivalents analysis—a (nearly extinct) defense to infringement in the modern understanding—traditional peripheral claiming applied it to claim construction in the ordinary course. See *id.* at 1205.

¹⁶¹ *Mayo*, 566 U.S. at 78–79.

¹⁶² Note the Court's characterization of the “audience” referred to by the “administering” step as a “pre-existing” audience. See *Mayo*, 566 U.S. at 78.

lar modes of “administering” the drug in light of the inventor’s contribution. Suppose at the time the invention was made, the drug was prescribed on a thrice-daily schedule. Some years after the patent, the drug began to be prescribed on a once-daily schedule. A doctor who then prescribed the drug on a three-pills-a-day regimen would count as “administering,” but a doctor prescribing once-a-day might not because the mode of prescribing the drug at the time of the invention could contract the scope of the patent from the outer boundaries set by the word “administering.”

The *Mayo* Court did not limit the claim in this way. Instead, it reasoned that the “administering” step signaled to doctors that the inventors had discovered something that could interest them.¹⁶³ The Court thus read the claim to extend beyond doctors who follow particular modes of administering the drug and to reach all the way to doctors who are simply interested in the relationship between metabolite levels and drug efficacy.

Because Step Two can expand the claim scope beyond the reach of its language, it makes more sense to view Step Two as reflecting central claiming principles, rather than peripheral claiming ones, traditional or modern. Still, the claim language and structure really do matter, more so than they might in a pure central claiming regime. Step Two might accordingly be understood as sitting somewhere on the spectrum between central and peripheral claiming, at a place called “point of novelty.”¹⁶⁴ This approach attributes particular significance to the claim elements that distinguish the inventor’s contribution from what came before.¹⁶⁵ So point of novelty takes from peripheral claiming an emphasis on the claim as written because the particular claim elements matter, and it takes from central claiming an emphasis on what the inventor has contributed to

¹⁶³ See *id.* (“[T]he ‘administering’ step simply refers to the relevant audience, namely, doctors who treat patients with certain diseases with thiopurine drugs.”).

¹⁶⁴ Bernard Chao argues that *Mayo* implicitly applies a point of novelty analysis, in which “courts would first examine the limitation that embodies the point of novelty to determine whether it describes an unpatentable concept” and, if so, “then determine whether the other limitations can bring the principle into the realm of patentable subject matter.” See Chao, *supra* note 10, at 83. Chao thus appears to read both Step One and Step Two as demanding a point of novelty approach. As explained in the text, I argue that *Mayo* (and the other recent patentable subject cases) require first a central claiming approach to understand what the claim is directed to, followed by a point of novelty search for some contribution aside from the ineligible subject matter.

¹⁶⁵ See Lemley, *supra* note 37, at 1263.

the art because the elements reflecting that contribution matter more.

The Court's explicit Step Two analyses appear to look for something in the claim elements that would distinguish them from the prior art. *Mayo* concluded that the "administering" step could not save the claim because it referred to "a pre-existing audience" and the "determining" step was similarly unhelpful because it told "doctors to engage in well-understood, routine, conventional activity previously engaged in by scientists who work in the field."¹⁶⁶ The focus, then, was on the "wherein" element, which could not save the claim—even though that element was concededly novel—because it reflected the ineligible subject matter itself.¹⁶⁷ This assessment of the contribution reflected in each element looks much like a point of novelty analysis. Again, *Alice* is similar.¹⁶⁸

It may be premature to say that Step Two applies a point of novelty analysis because none of the Court's recent patentable subject matter cases explicitly concluded that a patent that was directed to ineligible subject matter nonetheless incorporated an inventive concept that would save it from invalidity. So it is not clear what exactly the Court is looking for at Step Two. But for now, the most plausible understanding is that the Court is conducting a point of novelty search for an element that both cannot be found in the prior art and cannot be understood as reciting the ineligible subject matter itself.

C. Inventions in Context

If the Court is using a central claiming analysis in its eligibility cases, the next question is whether this is desirable. The Court's approach has some superficial appeal. Eligibility doctrine limits the kinds of things that can be patented, not simply

¹⁶⁶ *Mayo*, 566 U.S. at 79.

¹⁶⁷ See *id.* at 78 ("[T]he 'wherein' clauses simply tell a doctor about the relevant natural laws, at most adding a suggestion that he should take those laws into account when treating his patient."); cf. Dmitry Karshedt, *Photocopies, Patents, and Knowledge Transfer: "The Uneasy Case" of Justice Breyer's Patentable Subject Matter Jurisprudence*, 69 VAND. L. REV. 1739, 1777–81 (2016) (arguing that the mental steps captured by the "wherein" clause should be held as "per se inherently disclosed" under the inherent anticipation doctrine of 35 U.S.C. § 102).

¹⁶⁸ See *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2359–60 (2014). The Court there reasoned that the claim could not survive Step Two because, "[t]aking the claim elements separately, the function performed by the computer at each step of the process is '[p]urely conventional' and taken "as an ordered combination," the elements added nothing. *Id.* at 2359 (emphasis added). So we again see the Court focusing on particular elements, thereby imbuing the claim language with some importance, but emphasizing their relationship to the invention's point of novelty.

the ways in which inventors try to obtain rights in them; it therefore seems more appropriately directed at what the inventor actually did than at the words her lawyer used to obtain rights over her work.¹⁶⁹ Something like this appears to be driving the Court's concern that eligibility questions not turn on the "draftsman's art."¹⁷⁰ Central claiming's emphasis on what the inventor did thus appears more appropriate for patentable subject matter inquiries than does peripheral claiming's emphasis on claim language.

But this masks a deeper complexity. Because courts continue to answer patent *infringement* questions using peripheral claiming approaches, it is not clear why patent *eligibility* questions ought to be answered using central claiming ones. That is, if the actual reach of the claim will be limited on the infringement analysis to the boundaries set by the words of the claim, then why should the patentable subject matter analysis turn on things that lie beyond those boundaries?

The answer begins with the recognition that every invention is, at some level, an application of a law of nature, natural phenomenon, or abstract idea.¹⁷¹ The fact that an invention applies ineligible subject matter, however, cannot be enough for it to merit patentable subject matter scrutiny. We therefore need some way to distinguish inventions that have problematic relationships to ineligible subject matter from inventions that have unproblematic ones.

The problem is that the claim language itself offers no basis for discerning the invention's relationship to ineligible subject

¹⁶⁹ Cf. Duffy, *supra* note 8, at 645–46 (arguing that the prohibition on patenting abstract ideas properly migrated from a disclosure inquiry to a subject matter inquiry because "that characterization clearly indicates that the barrier to obtaining a patent lies in the nature of the alleged discovery, not simply in the words chosen by the applicant—or more frequently, by the applicant's attorney—to describe and disclose it"). Of course, the entire patent document is typically written by a lawyer. But the specification is designed more generally to explain what the inventor has done and the claims are designed more specifically to define the attendant legal rights.

¹⁷⁰ See *Alice*, 134 S. Ct. at 2359 (asserting that "the rule that '[l]aws of nature, natural phenomena, and abstract ideas are not patentable,' would be eviscerated if 'the determination of patent eligibility [were to] 'depend simply on the draftsman's art'"); *Mayo*, 566 U.S. at 72 (cautioning "against interpreting patent statutes in ways that make patent eligibility 'depend simply on the draftsman's art'"); *Parker v. Flook*, 437 U.S. 584, 593 (1978) (rejecting a reading of Section 101 that "would make the determination of patentable subject matter depend simply on the draftsman's art").

¹⁷¹ See *Mayo*, 566 U.S. at 71; Duffy, *supra* note 8, at 643 (recognizing that "inventors' contributions . . . are all grounded in nature's principles").

matter.¹⁷² We might therefore worry that all claims could, in principle, be deemed ineligible.¹⁷³ This worry is well-taken in a peripheral claiming world, where the claim language is the near-exclusive guide to the invention.¹⁷⁴ The claim language is not designed to describe the relationship between the invention and the underlying subject matter it applies; instead, the point of the claim language is to describe how the various parts of the invention relate to each other.¹⁷⁵ In a peripheral claiming world, then, the only solution is to abstract away from the claim language to divine some implicit relationship between the invention and the underlying subject matter.

But there is no way to know how far we must abstract away before answering the question of whether the invention is directed to ineligible subject matter. If we started with a claim to a hammer, we could eventually abstract far enough away that we would get to $F = ma$. In a peripheral claiming world, the words of the claims themselves define the invention, those words will always be about something other than the ineligible subject matter, and so it may be impossible to determine when claims that on their face are more limited than the ineligible subject matter are nonetheless directed to it in a way that raises eligibility concerns. This “levels of abstraction” problem is pervasive in patent law, and has been the source of much difficulty in subject matter questions in particular.¹⁷⁶

¹⁷² Cf. Golden, *supra* note 78, at 1080 (pointing to the specificity of the claim language in *Benson* to undermine the proposition that the invention in that case could be an abstract idea in the sense of being nonspecific).

¹⁷³ See Risch, *supra* note 95, at 53 (suggesting that the Court’s recent applications of the eligibility doctrine cast doubt on a wide range of inventions that should be deemed eligible). The Court has been sensitive to these concerns. See *Alice*, 134 S. Ct. at 2354 (“At the same time, we tread carefully in construing this exclusionary principle lest it swallow all of patent law.”).

¹⁷⁴ Again, “the name of the game is the claim.” *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (quoting Rich, *supra* note 39, at 499).

¹⁷⁵ See ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW & POLICY: CASES AND MATERIALS* 28–29 (6th ed. 2013) (explaining that the claim “must perform two functions: (a) list all the elements of the invention (i.e. the parts and features of the invention); and (b) describe how they interact” (emphasis omitted)).

¹⁷⁶ See Mark R. Carter, *Copyright’s Hand Abstractions Test for Patent’s Section 101 Subject-Matter Eligibility*, 30 SANTA CLARA HIGH TECH. L.J. 469 (2014) (applying Judge Hand’s levels of abstractions analysis to patentable subject matter problems); Tun-Jen Chiang, *The Levels of Abstraction Problem in Patent Law*, 105 NW. U. L. REV. 1097, 1100–01 (2011) (describing the problem of abstracting away from claim language as a pervasive problem in patent law); cf. Kevin Emerson Collins, *The Knowledge/Embodiment Dichotomy*, 47 U.C. DAVIS L. REV. 1279, 1310–14 (2014) (arguing that only some of the abstract ideas branch of eligibility cases employ a levels of abstraction analysis); Laakmann, *supra* note 8, at 53–59 (suggesting that patentable subject matter law polices some of the problems raised by levels of abstraction issues in other patent law doctrines).

The central claiming perspective reveals a better way: to distinguish problematic claims from unproblematic ones, we must understand not simply where the words of the claim locate the fences of the patent right, but more concretely just what it was that the inventor (allegedly) gave to society. It is true that peripheral claiming cannot help us do that. But it is also true that this is exactly what central claiming is good for. While the claim language is focused on internal questions regarding how the invention works, the specification can help answer external questions regarding the invention's relationship to the world in which it exists. Because central claiming looks to the specification to determine the scope of the patentee's rights, it offers some potential insight into the relationship between the claimed invention and the ineligible subject matter.

This offers a way out of the levels of abstraction problem. We do not need to take the claim language and abstract away until we reach some underlying ineligible subject matter. Instead, the central claiming perspective might ask simply whether the ineligible subject matter comprised part of the inventor's contribution. In the case of a hammer made by anyone other than Newton, $F = ma$ would not be part of the inventor's contribution. This approach implies that Newton's hammer patent will face more serious eligibility obstacles than hammer patents submitted by others. But, as the next Part demonstrates, that is an appropriate result in light of the role that other patentability doctrines—especially novelty and non-obviousness—would play in ensuring that any given patent does not provide practical exclusivity over ineligible subject matter.

The choice between peripheral and central claiming can also be considered as a species of the long-standing debate between rules and standards.¹⁷⁷ Rules are relatively bright-line dictates; standards are more flexible guidelines that anticipate subsequent tailoring.¹⁷⁸ Like rules, peripheral claiming demands large ex ante expenditures on delineating the scope of appropriate behavior because it requires the patentee to identify ex ante the complete set of things that the public will be

¹⁷⁷ See Burk & Lemley, *supra* note 11, at 1778 ("The differences between central claiming and peripheral claiming bear all the hallmarks of the classic debate over the relative virtues of rules and standards."). For the near-smallest possible sampling of the large literature on rules and standards, see Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557 (1992); Cass R. Sunstein, *Problems with Rules*, 83 CALIF. L. REV. 953 (1995).

¹⁷⁸ Burk & Lemley, *supra* note 11, at 1778.

unable to do without the patentee's permission.¹⁷⁹ Central claiming, meanwhile, is more akin to a standard because it demands a case-by-case analysis of the proximity between the inventor's contribution and some object of inquiry.¹⁸⁰

In the context of patent eligibility, peripheral claiming appears to have run into the classic rules problem of underinclusiveness.¹⁸¹ Claims will almost never literally encompass ineligible subject matter. Einstein would not submit a claim that looked like this: "A law for converting matter to energy comprising $E = mc^2$." If we took seriously the peripheral claiming mandate that a patent's scope is limited to things falling inside the boundaries of the claim language, then no (plausible) patent would raise eligibility concerns because the claims could always be drafted to keep the ineligible subject matter itself outside of its boundaries.¹⁸² Something like this might describe the era between *Chakrabarty* and *Bilski*—a peripheral claiming approach to eligibility led to extreme underinclusiveness, such that (pretty much) all claims were deemed eligible.¹⁸³

To remedy the underinclusiveness problem, courts might conclude that eligibility is implicated whenever ineligible subject matter relates somehow to the claimed invention, even if the ineligible subject matter is not itself the claimed invention. But, again, because all inventions apply ineligible subject matter in some fashion, all patents would be potentially ineligible. So on the other side of an underinclusive peripheral claiming approach to eligibility lies an overinclusive one. Indeed, some

¹⁷⁹ See *id.* at 1779; Fromer, *supra* note 11, at 757 (arguing that although peripheral claims delineate a set of objects, rather than a norm of behavior, they entail the same ex ante delineation costs as ordinary rules).

¹⁸⁰ See Fromer, *supra* note 11, at 759 (noting that central claiming, like standards generally, reduce ex ante expenditures by "postponing delineation . . . until adjudication"); Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 Wis. L. Rev. 905, 911 ("But at base the infringement inquiry in a central claiming system was a gestalt, case-by-case judgment call.").

¹⁸¹ See Sunstein, *supra* note 177, at 992–93.

¹⁸² See *Parker v. Flook*, 437 U.S. 584, 590 (1978) (rejecting the argument "that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process" because a "competent draftsman could attach some form of post-solution activity to almost any mathematical formula"); see also *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 77–78 (2012) (same); *Bilski v. Kappos*, 561 U.S. 593, 610 (2010) (same).

¹⁸³ See Golden, *supra* note 7, at 1767 (remarking that before *Bilski*, "highly expansive views of subject-matter eligibility had such strong support in a two-decade trend in the case law that one could wonder whether, other than some requirement of 'human ingenuity,' any truly meaningful limitations on patentable subject matter remained" (footnote omitted)).

commentators fear that this is the ultimate destination of the Court's new direction.¹⁸⁴

The Court's shift to central claiming can therefore be understood as a response to the underinclusiveness of its past peripheral claiming approaches and a preemptive response to potential overinclusiveness. Indeed, the standards-like character of central claiming is better suited to a nuanced, case-by-case eligibility inquiry of the kind that the Court appears to be developing. This is, then, another instance of the regular evolution from rules to standards and back again.¹⁸⁵ A rule frequently becomes a standard when strict application to new circumstances produces undesirable outcomes, increasing its apparent error costs; as courts apply the new standard over time to increasingly familiar circumstances, the newly established standard evolves back into a rule because courts see the possibility of a shortcut that reduces decision costs. The substantive law of patentable subject matter has also undergone this evolution over its history.¹⁸⁶ We should expect, then, that the claim interpretation standards will eventually harden again into rules as the cycle continues.

Although I have alluded to what the Court is doing in the substantive patentable subject matter analysis itself—aside from identifying the invention that will be subject to that analysis—I have yet to explicitly explain how that analysis works. It is to that task that I now turn.

III

RETHINKING PATENTABLE SUBJECT MATTER

The central claiming perspective reveals two distinct threads in the Court's eligibility jurisprudence. One thread

¹⁸⁴ See Rebecca S. Eisenberg, *Prometheus Rebound: Diagnostics, Nature, and Mathematical Algorithms*, 122 *YALE L.J. ONLINE* 341, 342 (2013) (describing uncertainty regarding diagnostic inventions in the wake of *Mayo*); Lefstin, *supra* note 78, at 567–68; Risch, *supra* note 95, at 53 (expressing concern that the Court's ahistorical Step Two test “would invalidate patents throughout history and, by extension, many otherwise meritorious patents today”).

¹⁸⁵ See Schlag, *supra* note 27, at 428–29 (noting “the tendency of rules to evolve or degenerate, depending upon our perspective, into standards, and standards to evolve or degenerate into rules”).

¹⁸⁶ See Duffy, *supra* note 8 (describing the history of failed efforts to craft eligibility rules and the modest successes with eligibility standards); see also Tun-Jen Chiang, *The Rules and Standards of Patentable Subject Matter*, 2010 *WIS. L. REV.* 1353 (categorizing different threads in patentable subject matter jurisprudence as examples of rules or standards).

attempts to filter out claims for which the inventor's description of her contribution does not plausibly distinguish it from existing knowledge. A second thread attempts to focus patentable subject matter scrutiny on a subset of claims—those for which other doctrines will be ineffective barriers to inventors obtaining practical exclusivity over laws of nature, natural phenomena, and abstract ideas. This Part describes those two threads and evaluates their normative implications, suggesting that the Court's moves might be justified to the extent that they conserve judicial and administrative resources.¹⁸⁷ This suggestion is qualified by several caveats, including the possibility that judges are not well situated to use the resource-conservation mechanisms the Court has supplied and the possibility that inventors will successfully game the screens the Court has set up.

Of course, the central claiming perspective does not answer every question raised by the Court's eligibility jurisprudence. Most pertinently, it does not reveal why laws of nature, natural phenomena, and abstract ideas should be excluded, or whether any other categories should be added to the list of excluded subject matter. As a result, I take here a minimalist approach to normative eligibility theory. For present purposes, all that needs to be true is that patentable subject matter law aims to exclude something like laws of nature, natural phenomena, and abstract ideas from the domain of the patent system. It does not matter (much) why those categories are excluded or precisely how their boundaries are drawn. Because these fairly minimalist premises seem to be the foundation of the Court's approach, adopting them here is sensible even if they do not resolve many interesting questions regarding patent law's domain.¹⁸⁸

The central claiming perspective also deepens a crucial mystery: what is an inventive concept under Step Two? The Court has suggested that its precedent—especially the notorious duo of *Flook* and *Diehr*—sheds light on this question. In

¹⁸⁷ It is unclear whether the Court has deliberately or inadvertently set up these distinct lines of eligibility jurisprudence. At a minimum, and as explained *infra*, the Court appears at least to intuit that the inventions it has considered raise different kinds of problems. So even if not fully articulated, the Court may well have the view that eligibility jurisprudence serves multiple masters. That said, the ambiguity in the claim interpretation approaches indicates that the Court does not have a completely developed project in mind here.

¹⁸⁸ See Strandburg, *supra* note 78, at 569–70 & n.18 (describing the Court's per se exclusion thread that prohibits patents on laws of nature, natural phenomena, and abstract ideas).

this Part, I use the central claiming perspective to show that *Flook* and *Diehr* are unhelpful because the difference in those cases lies at Step One, rather than at Step Two. I close by suggesting that *Myriad* may unexpectedly hold the key to the inventive concept.

A. Implausible Contributions

The first thread in the Court's recent eligibility quartet aims to filter out claims for which it is implausible to think that the inventor contributed anything at all. I will describe here the cases representing this thread, and then explore its normative foundation.

1. *Discerning the Implausible-Contributions Thread*

The ultimate goal of the patentable subject matter doctrine is to ensure that the inventor did the kind of thing that could, in principle, entitle her to patent protection.¹⁸⁹ One reason she might have failed to do so is that she did the kind of thing that the laws of nature, natural phenomena, and abstract ideas exclusions are trying to keep out of patent law.¹⁹⁰ But a more basic reason is that the inventor¹⁹¹ did nothing at all. While the specification in such cases describes what looks like an invention, a commonsense assessment of that description indicates that the inventor is not the one responsible for the underlying contribution. That is, the inventor's own description of her work does not plausibly distinguish it from what society already knew.

It is easy enough to imagine a case like this. Suppose someone today submits a specification describing how hard it is to move heavy objects, and contending that the invention solves this problem by reducing the friction associated with forward motion of heavy objects.¹⁹² The claim recites, "A transportation facilitation device including a circular rim; a bearing in which a hollow cylindrical member is rotatable about a rod

¹⁸⁹ See *infra* section III.B.1.

¹⁹⁰ Strandburg, *supra* note 78, at 582–86 (explaining per se exclusion thread in patentable subject matter). I discuss this possibility *infra* text accompanying notes 215–50.

¹⁹¹ It would be more precise in this instance to refer to the individual as the applicant (if we are still at the examination stage) or the patentee (if the patent has already issued) than as the inventor. The point of this thread is that the person seeking patent protection is exceedingly unlikely to be the person who actually introduced the invention to society. Still, for the sake of consistency with the remainder of the text, I will refer to the individual as the inventor.

¹⁹² Austl. Patent No. AU 2,001,100,012 A4.

situated within the hollow cylindrical member; and a series of connecting members connecting the circular rim with the hollow cylindrical member.”¹⁹³ So, you know, it’s a wheel.

This is, on its face, an implausible contribution. Even without conducting a search of the prior art, a commonsense evaluation of the inventor’s characterization of her contribution reveals that she is simply trying to obtain a patent on something that already exists.

Although not nearly as straightforward as the wheel example, something like this appears to be the concern underlying *Bilski* and *Alice*. Those cases are usually viewed as new entries in the Court’s long-troublesome line of abstract ideas cases,¹⁹⁴ but they are better understood as representing the newly-established implausible-contributions thread. In *Bilski*, the Court characterized the abstract idea underlying the inventor’s claim as the concept of hedging risk.¹⁹⁵ What made this an abstract idea was not any particular degree of generality or ephemerality.¹⁹⁶ Instead, it was the fact that “[h]edging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.”¹⁹⁷ And in *Alice*, the Court characterized the abstract idea as the concept of intermediated settlement.¹⁹⁸ Again, what made this an abstract idea was not its abstractness but instead its age—the Court explained that intermediated settlement “is a fundamental economic practice long prevalent in our system of commerce . . . [and] a building block of the modern economy.”¹⁹⁹ In the Court’s view, anyone with at least a passing familiarity with the financial industry would recognize the commonplace practices of hedging risk and intermediated settlement. And the specifications of the patents in *Bilski* and *Alice* can be read as doing no more than describing these commonplace practices.²⁰⁰

The Court’s concern in these cases was therefore not that the claims were too abstract to be eligible, but rather that the

193 *Id.* at 5.

194 *See supra* subpart I.B.

195 *Bilski v. Kappos*, 561 U.S. 593, 611 (2010).

196 *See Michael Risch, A Surprisingly Useful Requirement*, 19 GEO. MASON L. REV. 57, 60 (2011) (arguing that “*Bilski*’s method for commodities trading was not ‘abstract’ because it required three specific and concrete steps”).

197 *Bilski*, 561 U.S. at 611 (internal quotation marks omitted).

198 *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2356 (2014).

199 *Id.* at 2350 (internal quotation marks omitted).

200 *See* U.S. Patent App. No. 08/833,892 (*Bilski* patent application); U.S. Patent No. 5,970,479 (*Alice* patent one); U.S. Patent No. 6,912,510 (*Alice* patent two); U.S. Patent No. 7,725,375 (*Alice* patent three).

inventor did not contribute anything that the world did not already have.²⁰¹ When that is apparent on the face of the patent, the claim might be deemed ineligible because the patentee herself has been unable to distinguish her contribution from what was already known.

2. *Evaluating the Implausible-Contributions Thread*

It is easy enough to see why the claims in *Alice* and *Bilski* are undesirable. If someone other than the patentee has already produced and disclosed the invention at issue, then there is no reason to award her the exclusivity that a patent provides. But the underlying concern—that society will pay the price of a patent without receiving the benefit of a new invention—seems to raise concerns more appropriately directed at novelty and non-obviousness than at eligibility.²⁰² If these are simply cases in which there is no contribution to the storehouse of knowledge—rather than a contribution of the kind of knowledge that we want to keep out of the patent system—then

²⁰¹ See *Alice*, 134 S. Ct. at 2359 (reasoning that “each step of the [claimed] process is purely conventional” (internal quotation marks and brackets omitted)); *Bilski*, 561 U.S. at 612 (noting that the use of “well-known random analysis techniques” could not save the claims from ineligibility). Of course, there are other cases in which the inventive act might be the contribution of something so abstract that the patent system might be deemed an inappropriate mechanism for protecting the inventor. Indeed, some of the Court’s older cases—predating the *Mayo* framework—can be understood in this way. See *Gottschalk v. Benson*, 409 U.S. 63, 72–73 (1972) (holding unpatentable a claim to an algorithm for converting binary coded decimal numbers into pure binary). The important point for our purposes is simply that the Court’s recent abstract ideas cases represent a distinct eligibility thread: cases in which the inventor has not contributed anything at all.

²⁰² See Dennis Crouch & Robert P. Merges, *Operating Efficiently Post-Bilski by Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673, 1686–89 (2010) (arguing that many claims that raise patentable subject matter concerns also raise other validity concerns and that *Bilski* in particular likely presented a claim that could have been held invalid for obviousness). Indeed, *Alice* and *Bilski* seem to go out of their way to conduct eligibility analyses when a novelty or non-obviousness one would do just fine. Both cases cited evidence of prior art that would form the foundation for a novelty or non-obviousness inquiry. See *Alice*, 134 S. Ct. at 2356 (first citing Henry C. Emery, *Speculation on the Stock and Produce Exchanges of the United States*, 7 STUD. HIST., ECON. & PUB. L. 283, 346–56 (1896); and then citing Yesha Yadav, *The Problematic Case of Clearinghouses in Complex Markets*, 101 GEO. L.J. 387, 406–12 (2013); and then citing JOHN C. HULL, RISK MANAGEMENT AND FINANCIAL INSTITUTIONS 103–04 (3d ed. 2012)); *Bilski*, 561 U.S. at 611 (first citing DIMITRIS N. CHORAFAS, INTRODUCTION TO DERIVATIVE FINANCIAL INSTRUMENTS 75–94 (2008); and then citing CLYDE P. STICKNEY, ROMAN L. WEIL, KATHERINE SCHIPPER & JENNIFER FRANCIS, FINANCIAL ACCOUNTING: AN INTRODUCTION TO CONCEPTS, METHODS, AND USES 581–82 (13th ed. 2010); and then citing STEPHEN A. ROSS, RANDOLPH W. WESTERFIELD & BRADFORD D. JORDAN, FUNDAMENTALS OF CORPORATE FINANCE 743–44 (8th Ed. 2008)).

it is hard to understand why patentable subject matter should do the work.

To the extent that this thread is justified, it may be because it allows us to avoid engaging in costly assessments of patentability when it is apparent on the face of the patent that the claim is doomed. Patent litigation is notoriously expensive.²⁰³ Moreover, patent examination at the PTO is usually cursory, in part because it would be too costly for any given examiner to conduct the kind of thorough search for prior art that a novelty or non-obviousness inquiry requires.²⁰⁴ As a result, examiners issue many patents that would fail a validity assessment in litigation.²⁰⁵ And these patents are not harmless; to the contrary, they can be the basis for nuisance settlement demands and they increase the search costs that the public bears when seeking information on valuable patents.²⁰⁶ There is accordingly a place in patent law for doctrines that can quickly weed out claims that are unlikely to withstand validity tests, without having to actually conduct those expensive tests themselves.

To rehabilitate *Alice* and *Bilski*, we might accordingly view them as a sort of patent law analogue to civil procedure's *Twiqbal* requirement.²⁰⁷ For decades, the notice pleading stan-

²⁰³ See Gaia Bernstein, *The Rise of the End User in Patent Litigation*, 55 B.C. L. REV. 1443, 1483–86 (2014) (comparing high mean costs of patent litigation to other kinds of civil litigation and attributing some of that difference to the need for expert testimony); Greg Reilly, *Linking Patent Reform and Civil Litigation Reform*, 47 LOY. U. CHI. L.J. 179, 204–16 (2015) (recognizing that patent litigation is unusually expensive, but suggesting that the cause is more likely attributable to remedial issues than technical questions of validity or infringement).

²⁰⁴ See Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law's Presumption of Validity*, 60 STAN. L. REV. 45, 53–56 (2007) (describing cursory review necessitated by resource constraints that examiners face).

²⁰⁵ See *id.* at 47.

²⁰⁶ See Roger Allen Ford, *Patent Invalidity Versus Noninfringement*, 99 CORNELL L. REV. 71, 74 (2013) (suggesting that “invalid patents are arguably the single biggest problem in modern patent law” because it “is impossible to analyze all these patents” leading to nuisance settlements). The classic treatments of this issue are BESSEN & MEURER, *supra* note 66; BURK & LEMLEY, *supra* note 66; JAFFE & LERNER, *supra* note 66.

²⁰⁷ Cf. MARK A. LEMLEY, PETER S. MENELL, ROBERT P. MERGES, *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE: 2016 III-146-47* (2016) (analogizing the current approach to eligibility to antitrust law's “quick look” doctrine, which allows courts “to make a cursory analysis of an alleged violation to determine if it will harm competition”); Saurabh Vishnubhakat, *The Antitrusting of Patentability*, 48 SETON HALL L. REV. 71, 93–97 (2017) (arguing that patent law's eligibility requirement has long borrowed from antitrust law's *per se* rule, but that this reliance is undesirable because, *inter alia*, eligibility decisions are often made before claim construction). Although it is possible to view the implausible-contributions thread as analogous to antitrust's quick look doctrine, *Twiqbal* is the better analogy because the quick look rule is itself the substantive analysis of the alleged facts, while in both *Twiqbal* and the Court's eligibility jurisprudence, the plausi-

dard of *Conley v. Gibson*²⁰⁸ dismissed complaints only when the plaintiff was unable to allege any set of facts that would entitle her to relief.²⁰⁹ The *Twiqbal* requirement—articulated in *Bell Atlantic Corp. v. Twombly*²¹⁰ and *Ashcroft v. Iqbal*²¹¹—replaced the lax *Conley* standard with the more stringent requirement that the complaint “state a claim to relief that is plausible on its face.”²¹² In other words, while *Conley*’s notice pleading regime permitted a plaintiff to proceed even on a set of facts that were exceedingly unlikely to be true, *Twiqbal*’s plausibility pleading demands that the plaintiff allege something “more than a sheer possibility that the defendant has acted unlawfully” before she can enter the courthouse door.²¹³ The motivation for this shift was the Court’s view that there are many cases in which a commonsense initial assessment of the plaintiff’s case can avoid expensive discovery that would ultimately prove fruitless.²¹⁴

We might understand *Alice* and *Bilski* as establishing a similar standard—call it *Aliski*²¹⁵ plausibility—and for similar reasons. The patent system could demand, as a threshold eligibility matter, that an inventor provide a description of her invention that at least plausibly represents something new.²¹⁶

bility analysis asks whether it would be sensible to engage in a substantive analysis of the adequacy of the alleged facts. For a similar argument, see Paul R. Gugliuzza, *Quick Decisions in Patent Cases*, 106 GEO. L.J. (forthcoming 2018) (manuscript at 35–36) (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2987289) (arguing that the Court’s recent patentable subject matter cases offer a mechanism for quickly invalidating weak patents). I depart from Gugliuzza in part by emphasizing this as a thread in the Court’s jurisprudence distinct from the thread represented by *Mayo* and *Myriad*.

²⁰⁸ 355 U.S. 41, 47 (1957).

²⁰⁹ See Arthur R. Miller, *From Conley to Twombly to Iqbal: A Double Play on the Federal Rules of Civil Procedure*, 60 DUKE L.J. 1, 18 (2010).

²¹⁰ 550 U.S. 544 (2007).

²¹¹ 556 U.S. 662 (2009).

²¹² *Twombly*, 550 U.S. at 570; see also *Iqbal*, 556 U.S. at 678 (stating that this requirement is met “when the plaintiff pleads factual content that allows the court to draw the reasonable inference that the defendant is liable”).

²¹³ *Iqbal*, 556 U.S. at 678.

²¹⁴ See *id.* at 679 (noting that the analysis will ask the “court to draw on its judicial experience and common sense”); Scott Dodson, *New Pleading, New Discovery*, 109 MICH. L. REV. 53, 64 (2010) (“The reason why the Supreme Court has pushed this change [to *Twiqbal*’s standard] seems fairly obvious: the Court is concerned with high discovery costs.”).

²¹⁵ Sorry, not sorry.

²¹⁶ The Court has characterized eligibility as a threshold inquiry. See *Bilski v. Kappos*, 561 U.S. 593, 602 (2010); *Diamond v. Diehr*, 450 U.S. 175, 188 (1981); *Parker v. Flook*, 437 U.S. 584, 593 (1978). It is unclear whether that necessarily means that eligibility must be considered before other validity issues. See Crouch & Merges, *supra* note 202, at 1679–80 (challenging the assumption that the “lexical priority of § 101 . . . dictate[s] the order in which validity issues must be

When the inventor herself cannot articulate a plausible contribution to the art, it is unlikely that it will be worth evaluating whether her claims satisfy the full panoply of patentability rules. There are significant savings to be had if we can cheaply and accurately identify invalid patents at the outset, without having to conduct costly searches of the prior art or gather expert testimony regarding the invention.²¹⁷

That is, however, a big if. The Court's *Twiqbal* jurisprudence has been subject to vigorous critiques. Perhaps the most devastating attacks concern *Twiqbal*'s effects on cases for which the relevant evidence is usually in the defendant's hands, and therefore inaccessible to the plaintiff before discovery.²¹⁸ By preventing the plaintiff from even reaching the discovery stage, *Twiqbal*'s plausibility pleading requirement may effectively eviscerate plaintiffs' ability to bring these kinds of cases.

This critique has much less force in the patent context. Indeed, the inventor is typically the individual best situated to access information regarding the differences between her invention and the prior art. After all, the inventor is the one who has (allegedly) produced the invention, so much of the information about it will be uniquely in her possession. And perhaps it is reasonable also to expect her to know about the prior art she must distinguish her contribution from, so long as it is the sort of thing that anyone with a mere passing familiarity with the field knows about.²¹⁹

addressed"). The argument here is only that we can understand this as a conceptual threshold—the inventor has to at least be able to articulate a plausible version of an invention—and that in some contexts the most efficient ordering of analyses will begin with this one.

²¹⁷ See Bernstein, *supra* note 203, at 1483–86; Lichtman & Lemley, *supra* note 204, at 53–56. *But see* Reilly, *supra* note 203, at 211–16 (arguing that the technical issues in patent litigation—claim construction, validity, and infringement—do not entail particularly significant discovery costs).

²¹⁸ See Jonah B. Gelbach, *Material Facts in the Debate over Twombly and Iqbal*, 68 STAN. L. REV. 369, 379 (2016) (“[C]ritics have argued that the plausibility pleading standard will reduce access to justice for plaintiffs with meritorious claims, especially in disputes whose alleged wrongdoers control access to the information necessary to meet the heightened pleading standard.”); A. Benjamin Spencer, *Pleading and Access to Civil Justice: A Response to Twiqbal Apologists*, 60 UCLA L. REV. 1710, 1731–35 (2013) (arguing that *Twiqbal*'s plausibility pleading standard is “poorly designed to achieve the screening goal it espouses” because, among other things, it “risks screening meritorious suits” (internal quotation marks omitted)).

²¹⁹ As the next section makes clear, the ineligible-contributions thread seeks to identify at Step One claims that need heightened eligibility scrutiny at Step Two—precisely the opposite of the commonsense assessment that *Aliski* might justifiably impose. See *infra* text accompanying notes 215–50.

To be sure, if *Aliski* turns on the kind of prior art that takes serious digging through technical literatures to find, its plausibility demand will become counterproductive. Indeed, we almost surely need a variation of the Step Two analysis—a quick and easy one—to handle claims in the implausible-contributions thread different from the variation of Step Two that we need for the ineligible-contributions thread.²²⁰ With this caveat, it does not seem troubling to demand that the inventor provide a plausible description of what she has added to the art before the patent system engages in costlier validity assessments—at a minimum, it is easier to justify than the *Twiqbal* demand that a plaintiff provide a plausible account of the defendant's wrongdoing when only the defendant has access to evidence of the wrongdoing.

Another critique of *Twiqbal* is that it makes too much turn on the idiosyncrasies of individual judges.²²¹ Motions to dismiss under *Twiqbal* require judicial assessment of the likelihood that certain allegations are true before evidence supporting or refuting them can be presented to the court. Judges will therefore have to rely on their own subjective evaluations of the allegations in complaints in order to resolve *Twiqbal* motions.²²²

This critique has greater force in the *Aliski* context. In order for *Aliski* plausibility to be worthwhile, individual judges and examiners need to be able to relatively accurately assess whether the specification reveals that the inventor has made some plausible contribution to the field. But it is unlikely that any individual judge is sufficiently familiar with the wide range of technological fields encompassed by issued patents to conduct a meaningful plausibility analysis; in unfamiliar areas, judges will rely on their gut instincts. The question whether a particular patent survives may then turn on whether the patentee is lucky enough to land a judge that happens to understand the contribution she has made. This would sap patents

²²⁰ See Sean B. Seymore, *The Presumption of Patentability*, 97 MINN. L. REV. 990, 1023–46 (2013) (arguing that patent examination inappropriately demands evidence of unpatentability from examiners, and should instead be restructured to demand more evidence of patentability from patentees).

²²¹ See A. Benjamin Spencer, *Understanding Pleading Doctrine*, 108 MICH. L. REV. 1, 11 (2009) (“[T]he Twombly pleading standard requiring plausibility might be too subjective to yield predictable and consistent results across cases.”).

²²² See Arthur R. Miller, *Simplified Pleading, Meaningful Days in Court, and Trials on the Merits: Reflections on the Deformation of Federal Procedure*, 88 N.Y.U. L. REV. 286, 335–36 (2013); Spencer, *supra* note 218, at 1732 (“[P]lausibility pleading is . . . hopelessly subjective.”).

of the certainty inventors need in order to invest in their inventions.²²³

Alice and *Bilski* may have presented relatively easy cases—intermediated settlement and commodity price risk hedging are fairly well-known practices. But they are harder than the wheel example, and, as others have noted, there were at least some claims in those cases that may well have represented real contributions to their respective fields.²²⁴ Subsequent Federal Circuit cases have posed still more difficult questions.²²⁵ There is a serious risk that *Aliski* plausibility reviews might be producing false negatives, rejecting patents that should survive.²²⁶ The question whether *Aliski* filtering is justified would turn in part on comparing the costs of these mistakes to the administrative resources saved by conducting plausibility analyses rather than full-blown novelty and non-obviousness analyses.²²⁷

In addition to being error-prone, it might be expensive to use eligibility doctrine to filter out claims covering implausible contributions. In some cases, perhaps including *Alice* and *Bilski*, there are real factual disputes regarding what the patent asserts the inventor has contributed. And the question of what the inventor has contributed is fundamentally a claim construction issue.²²⁸ While the ultimate question of claim meaning is one of law, there can be factual questions underlying

²²³ See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 275–80 (1977) (proposing that patents ought to be granted early in the development timeline to encourage subsequent investments in developing inventions). For modern updates on Kitch's prospect theory, see John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439 (2004); F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. REV. 55, 62–66 (2003); Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 357–61 (2010).

²²⁴ See Risch, *supra* note 196, at 61–62 (arguing that the narrower claims in *Bilski* may have provided practical and specific benefits, and that the Court was wrong to reject “them with no analysis as it did”).

²²⁵ *Compare* *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716–17 (Fed. Cir. 2014) (rejecting as ineligible a patent claiming a method for allowing users to watch content after viewing an advertisement), *with* *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1259 (Fed. Cir. 2014) (holding that a patent claiming a method for creating websites with a uniform look and feel is not directed to an abstract idea).

²²⁶ See Andres Sawicki, *Better Mistakes in Patent Law*, 39 FLA. ST. U. L. REV. 735, 761–77 (2012) (explaining how the costs of false negatives vary according to doctrine, industry, and timing).

²²⁷ See Gugliuzza, *supra* note 207, at 39 (noting the risk of decreased accuracy from using eligibility doctrine to quickly resolve validity questions).

²²⁸ The Federal Circuit is therefore incorrect to the extent that it has indicated that a claim construction analysis need not precede an eligibility analysis. See Holbrook & Janis, *supra* note 94, at 362–63.

it.²²⁹ So it may turn out that at least some of the same expensive fact development is required to answer eligibility questions as is required to answer novelty and non-obviousness ones.²³⁰ If so, then *Aliski* plausibility would not represent much of a cost savings over simply letting the claim through and assessing it using ordinary novelty and non-obviousness analyses.

Still, there is in principle some room for an appropriately cabined *Aliski* plausibility thread. If judges and examiners can cheaply and reliably use the specification to determine whether there is even a plausible contribution, then the patent system might be able to avoid some unnecessarily expensive novelty and non-obviousness inquiries at an acceptable cost of mistaken rejections.

B. Ineligible Contributions

The second thread in the Court's recent eligibility jurisprudence aims to closely scrutinize claims for which the inventor's contribution included the identification of a law of nature, natural phenomenon, or abstract idea. Again, I will first describe the cases representing this thread, and then assess its normative foundation.

1. *Discerning the Ineligible-Contributions Thread*

On almost any normative theory, patentable subject matter doctrine should at least prevent the issuance of claims that would provide exclusivity over laws of nature, natural phenomena, or abstract ideas. When some part of the invention bears a close relationship to such subject matter, eligibility doctrine might correspondingly apply additional scrutiny. This is the inventive concept requirement—when a claim raises eligibility red flags, Step Two's inventive concept demands some additional material to assuage the concerns of normative eligibility theory.²³¹

²²⁹ *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996). The Court has recently reaffirmed the role of fact development in claim construction. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015) (holding that factual determinations made on the basis of extrinsic evidence during claim construction are entitled to clear error review on appeal).

²³⁰ See Gugliuzza, *supra* note 207, at 44–46 (arguing that courts resolving patent eligibility motions should more carefully scrutinize whether the motions turn on underlying questions of fact).

²³¹ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 77 (2012) (characterizing the Step Two search for an inventive concept as a search for “additional features that provide practical assurance that the process is more than a drafting effort designed to monopolize the law of nature itself”).

But there may at times be other ways to prevent claims that would provide exclusivity over ineligible subject matter.²³² In particular, novelty or non-obviousness will reject claims providing exclusivity over a law of nature, natural phenomenon, or abstract idea that we already know about.²³³ The second thread in the Court's patentable subject matter jurisprudence attempts to avoid these potentially redundant inquiries—it appears to use Step One to identify scenarios in which the novelty or non-obviousness doctrines can satisfy the concerns of normative eligibility theories, thereby killing two normative birds with one doctrinal stone.²³⁴

This thread is represented by *Mayo* and *Myriad*. Both of those cases involved claims arising from the inventor's identification of a previously unknown law of nature or natural phenomenon. In *Mayo*, the inventors were the first to identify the metabolite thresholds that correlated with thiopurine efficacy and toxicity.²³⁵ Because those thresholds were not known before the inventors' work, novelty and non-obviousness would have been ineffective barriers to a claim that provided exclusivity over the thresholds themselves. As a result, the claim required the close eligibility scrutiny of Step Two.²³⁶

Although I will have more to say about *Myriad* momentarily, that case presented a similar scenario. The inventors there were the first to uncover the location and sequence of genes responsible for increasing the risk of breast and ovarian

²³² See Crouch & Merges, *supra* note 202, at 1686–89 (explaining that eligibility inquiries will overlap with other validity inquiries, and that this “doctrinal overlap is not surprising given that subject matter eligibility overlaps with many of the other patentability doctrines in both purpose and operation”).

²³³ *Cf. id.* at 1688 (suggesting that “claims directed toward naturally occurring phenomena—unpatentable under § 101—will likely fail the newness requirements of §§ 102 and 103(a)”).

²³⁴ The Court thus appears to be pursuing a version of the ordering approach proposed by Dennis Crouch and Robert Merges. See *id.* But while Crouch and Merges recommend treating eligibility questions “as an exception and delay[ing their assessment] until after the application passes muster with all other patentability doctrines,” the Court has gone the opposite direction, evaluating first the eligibility question of which doctrine could most efficiently resolve the overall validity matter. *Id.* at 1690. It is also worth noting that this thread does not appear to consist of the kind of easily-applied eligibility rule that Tun-Jen Chiang suggests should be applied first—it is very much a flexible standard requiring nuanced assessment of the patent's scope. See Chiang, *supra* note 186, at 1376–78.

²³⁵ *Mayo*, 566 U.S. at 73–74.

²³⁶ See *supra* pp. 118–19 (describing the Step Two search for an inventive concept).

cancer.²³⁷ So, again, novelty and non-obviousness would have been ineffective bars to claims providing practical exclusivity over the genes themselves. Of course, there is a fair amount of work being done here by the classification of the thresholds as laws of nature and the genetic sequences as natural phenomena. Still, taking those classifications as given, it seems that both of these cases are part of the Court's effort to train close eligibility scrutiny—the search for the inventive concept—on scenarios in which the inventor herself has contributed the ineligible subject matter.

None of the Court's recent quartet provides an example of the other strand in this thread: a scenario in which the claim has a close relationship to ineligible subject matter that was well known before the inventor's work. For that, we must turn to an older case: *Diamond v. Diehr*.²³⁸ The Court has repeatedly pointed to *Diehr* as an example of a claim that satisfied Step Two's inventive concept requirement.²³⁹ *Diehr*, however, is better understood as a Step One case.

The patent in *Diehr* described “a process for molding raw, uncured synthetic rubber into cured precision products.”²⁴⁰ Pursuant to the process, constant measurements of temperature inside the rubber mold would be fed into a computer; the computer would then use the Arrhenius equation—a well-known formula describing the rate of chemical reactions—to recalculate the amount of time the mold had to be closed.²⁴¹ The claim's reliance on the Arrhenius equation, which could be readily understood as a law of nature, accordingly raised a subject matter question.²⁴²

²³⁷ *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2112 (2013).

²³⁸ 450 U.S. 175 (1981).

²³⁹ See *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2358–59 (2014); *Mayo*, 566 U.S. at 80–82.

²⁴⁰ 450 U.S. at 177.

²⁴¹ *Id.* at 178–79.

²⁴² *Id.* at 191 (“We recognize, of course, that when a claim recites a mathematical formula (or scientific principle or phenomenon of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract.”). The Court's apparent view of the Arrhenius equation as a mathematical formula and repeated reliance on *Benson* and *Flook* suggest that the patent was suspect under the abstract idea branch of patentable subject matter. *Id.* at 177, 181, 185–86. But its characterization of *Mackay's* statement—“[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be”—as taking the Court “a long way toward the correct answer in this case” suggests that it could also be understood under the law of nature branch. *Id.* at 188. Either way, the important point for present purposes is simply that the inventor's contribution was understood as something other than the ineligible

But the Court viewed the patent as “drawn to an industrial process for the molding of rubber products,” rather than to the Arrhenius equation itself.²⁴³ This is most plausibly because the inventors’ contribution to the art “reside[d] in the process of constantly measuring the actual temperature inside the mold.”²⁴⁴ The inventors did not contribute the Arrhenius equation, which was well known long before the inventors’ work.²⁴⁵ The *Diehr* claims were therefore not directed to ineligible subject matter under Step One because novelty and non-obviousness would have been effective barriers against a claim providing practical exclusivity over the Arrhenius equation.

This is not to say that those doctrines would have invalidated the claim. It is only to say that the claim likely could not have satisfied the novelty and non-obviousness requirements if it provided practical exclusivity over the Arrhenius equation. This is because, in order to satisfy those requirements, the claim would have had to cover something that a skilled artisan would not have deemed apparent in light of the Arrhenius equation itself.²⁴⁶ To the extent that normative eligibility theories seek to prevent claims that provide practical exclusivity over ineligible subject matter, the novelty and non-obviousness doctrines would have been effective vehicles for achieving normative eligibility goals in *Diehr*.

2. *Evaluating the Ineligible-Contributions Thread*

A patent must satisfy several independent doctrinal requirements, each of which is designed to serve a distinct normative goal. The novelty doctrine, for example, requires that no prior art reference disclose each and every element of the claimed invention; this serves the normative goal of ensuring that the inventor provides something new before society pays the price of a patent in return.²⁴⁷ Non-obviousness rejects claims that a skilled artisan, applying her ordinary creativity, would have deemed obvious in light of the prior art; this test tries to guarantee that patents are issued only when the incen-

subject matter used in the invention, and was therefore not directed to it in the way that *Mayo* views as suspect.

²⁴³ *Id.* at 192–93.

²⁴⁴ *Id.* at 178.

²⁴⁵ *Id.* at 177–78 n.2.

²⁴⁶ *Id.* at 191 (“[I]t may later be determined that the respondents’ process is not deserving of patent protection because it fails to satisfy the statutory conditions of novelty under § 102 or nonobviousness under § 103.”).

²⁴⁷ 35 U.S.C. § 112 (2012); Sean B. Seymore, *Rethinking Novelty in Patent Law*, 60 DUKE L.J. 919, 931 (2011) (“[N]ovelty serves to safeguard the public’s right to enjoy what it already possesses.”).

tive they provide leads to the invention.²⁴⁸ Utility, meanwhile, requires that the invention have some minimal practical use; this serves the normative goal of ensuring that patents are not issued so early in the innovation lifecycle that it would impede progress by requiring too many and too costly transactions for subsequent research and development.²⁴⁹

Ordinarily, we cannot further the normative goals of one requirement by applying the doctrinal test of another. For example, imagine a scientist synthesizes a new molecule. This passes the novelty requirement because the molecule had not existed before. But there is no known use for the molecule, raising the utility concern that numerous complex transactions would stand in the way of efforts to investigate the molecule's capabilities and prepare it for the market. The fact that no single prior art reference discloses the molecule does not ensure that it is sufficiently far along the research and development pathway to be an appropriate candidate for a patent.

But this is not always the case. Whether incidentally or because their normative aims at times overlap, one doctrinal requirement will occasionally serve the normative goals of another.²⁵⁰ In these circumstances, we could potentially reduce administrative costs by testing the invention against the one requirement that serves both its own normative goals and those of another.

Complicating this analysis is the fact that patentable subject matter lacks a firm normative grounding.²⁵¹ The leading candidate builds on the idea of preemption.²⁵² The intuition

²⁴⁸ See 35 U.S.C. § 103 (2012); *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007); Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1614 (2011); Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 3 (1992).

²⁴⁹ *Brenner v. Manson*, 383 U.S. 519, 535 (1966) (concluding that a claim to a product that "either has no known use or is useful only in the sense that it may be an object of scientific research" fails to satisfy the utility requirement); Michael Risch, *Reinventing Usefulness*, 2010 BYU L. REV. 1195, 1229–30 (describing how the utility doctrine tries to avoid problems that arise when patents are awarded too early).

²⁵⁰ See Crouch & Merges, *supra* note 202, at 1686–89 (describing overlap among validity doctrines).

²⁵¹ Anderson, *supra* note 78, at 281 (noting that "no consensus exists for the theoretical value" of patentable subject matter doctrine).

²⁵² *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014) (characterizing preemption as "the concern that drives" the laws of nature, abstract ideas, and natural phenomena exclusions); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72 (2012) (warning "against upholding patents that claim processes that too broadly pre-empt the use of a natural law"); *id.* at 85 ("The Court has repeatedly emphasized" the "concern that patent law not inhibit further discovery by improperly tying up the future use of laws of nature.").

underlying preemption theory is that a patent covering subject matter from the prohibited categories “might tend to impede innovation more than it would tend to promote it” because those categories represent “the basic tools of scientific and technological work.”²⁵³ In some variations, this is because many innovations—unknown at the time of the original invention—will ultimately fall within the scope of the patent on the original invention.²⁵⁴ In other variations, the downstream impacts arise because other inventors will want to develop distinct technologies that would not fall within the scope of the original patent, but were nonetheless made possible by virtue of the technology it covered.²⁵⁵

As Katherine Strandburg explains, however, preemption theory does not provide a sufficient justification for patentable subject matter—we need some antecedent theory that identifies the categories of subject matter that should be excluded from patent law.²⁵⁶ For present purposes, though, it is enough that eligibility doctrine be understood as an effort to keep some content out of the patent system, and that the excluded content comprises some variation on the laws of nature, natural phenomena, and abstract ideas triad.²⁵⁷

²⁵³ *Mayo*, 566 U.S. at 86 (internal quotation marks omitted); Anderson, *supra* note 78, at 282–83. Other normative theories more generally suggest that the incentives created by some categories of patents are outweighed by their associated costs; in some variations, this is because the particular category presents unusually high administrative costs flowing from notice problems associated with the subject matter, while in other variations the marginal incentive associated with a patent is especially low because other mechanisms for eliciting innovation suffice. See Anderson, *supra* note 78, at 284–86 (describing “innovation-harm” and “over-reward” theories of patentable subject matter). Finally, deontological justifications have also been proposed as replacements for or supplements to these utilitarian theories. See Chiang, *supra* note 8, at 1873–85.

²⁵⁴ The standard example is the claim at issue in *O’Reilly v. Morse*, 56 U.S. 62 (1853). Morse’s claim was so broad that it would have covered not only the telegraph but also many other ways of using electromagnetism to communicate; the telephone and maybe even email would have fallen within its scope. See Strandburg, *supra* note 78, at 573–74.

²⁵⁵ The standard example is the claim at issue in *Gottschalk v. Benson*, 409 U.S. 63 (1972). Because computers convert numerals from binary-coded decimal to pure binary in a wide array of procedures, the claim to an algorithm for that conversion would be useful to almost anyone using computers to generate other innovations. See Strandburg, *supra* note 78, at 576–78.

²⁵⁶ See Strandburg, *supra* note 78, at 586–87.

²⁵⁷ This latter proposition is contested, although it has enough support to serve its role here. See *id.* at 591–614 (disentangling conflicts in the cases regarding whether subject matter is per se excludable or excludable only on the grounds of some kind of preemption principle). For another view, see Timothy R. Holbrook & Mark D. Janis, *Expressive Eligibility*, 5 U.C. IRVINE L. REV. 973, 976–90 (2015) (arguing that the excluded categories serve primarily expressive rather than gatekeeping roles).

Whatever the precise grounding for patentable subject matter, novelty and non-obviousness will sometimes reject patents that normative eligibility theory also tries to keep out.²⁵⁸ The ineligible-contributions thread appears to be the Court's effort to avoid redundant assessments of the novelty, non-obviousness, and eligibility requirements by allocating claims to novelty and non-obviousness when it appears that those doctrines can adequately prevent patents that would provide practical exclusivity over the ineligible subject matter applied in a particular claim.

To see how this could work, suppose that an inventor is the first to discover the neurological causes of Alzheimer's disease. She then applies for a patent that covers, at least in part, these neurological mechanisms. This patent raises no normative novelty or non-obviousness concerns. We did not have this information before the inventor's work, and the patent incentive was at least partly responsible for motivating the inventor to obtain and disclose it. This patent should then pass the novelty and non-obviousness tests because the prior art will not contain a reference disclosing the causes of Alzheimer's disease or anything close to it—by hypothesis, the inventor herself added it to the storehouse of knowledge.²⁵⁹

Normative eligibility theories, however, assert that at least some of the subject matter covered by this patent should be kept out of the patent system because it covers neurological mechanisms, which are natural phenomena.²⁶⁰ Because only the patentable subject matter doctrine could prevent the inventor from obtaining a patent providing her with practical exclusivity over the neurological mechanisms that cause Alzheimer's disease, this kind of scenario calls for doctrinal eligibility scrutiny—no other doctrine will advance normative eligibility objectives.

Now suppose that an inventor applies for a patent that would provide her with some degree of exclusivity over $E = mc^2$. Here, the concerns of normative eligibility theories might be reasonably well served by the novelty and non-obviousness doctrines. Because Einstein already disclosed this law of na-

²⁵⁸ See Crouch & Merges, *supra* note 202, at 1686–89 (describing doctrinal overlaps); Michael Risch, *Everything is Patentable*, 75 TENN. L. REV. 591, 598–600, 602–04 (2008) (reviewing cases decided on eligibility grounds that appear as though they would have reached the same outcome if assessed from a novelty or non-obviousness perspective).

²⁵⁹ 35 U.S.C. §§ 102, 103 (2012); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417–18 (2007).

²⁶⁰ See Strandburg, *supra* note 78, at 590.

ture, the patent will not issue unless it covers something that would not be coextensive with—or that a skilled artisan would not have viewed as an obvious step from— $E = mc^2$ itself.

The upshot of these two scenarios is that novelty and non-obviousness might do a reasonably acceptable job of rejecting claims that cover ineligible subject matter, but only when the prior art includes references disclosing that subject matter. The Court appears to have been using the Step One “directed to” inquiry to allocate eligibility scrutiny according to this principle. Inventions arising from a contribution that includes the identification of ineligible subject matter are, under Step One, directed to that subject matter and accordingly get heightened scrutiny from Step Two.²⁶¹ Inventions relying on well-known ineligible subject matter are not directed to it—and do not get heightened Step Two scrutiny—because novelty and non-obviousness will ensure that such claims do not provide practical exclusivity over the ineligible subject matter.²⁶²

Nevertheless, it is conceptually unsatisfying to say that some claims would pass a patentable subject matter test—even though they clearly attempt to cover ineligible content—simply because novelty and non-obviousness would also reject them. The reading here of the ineligible-contributions thread suggests that we do not need eligibility doctrine to achieve the eligibility goal of preventing a patent explicitly claiming $E = mc^2$ because we could simply rely on novelty and non-obviousness instead. But because this is exactly and plainly the kind of thing that eligibility theories want to keep out, it still seems inappropriate to conclude that such a patent satisfies the patentable subject matter requirement.

Perhaps we can salvage some conceptual coherence by reframing Step One as an explicit allocating analysis, assigning claims to doctrines that will efficiently further normative goals, and as distinct from the actual patentable subject matter inquiry at Step Two. Or perhaps we simply conclude that it is worth paying the price of conceptual coherence for the savings in administrative costs. Either way, there is an uneasy fit between the ineligible-contributions thread and the overt normative tasks assigned to the various patentability requirements.

Moreover, an effort to allocate claims to doctrines will be subject to two distinct vulnerabilities. First, an inventor who

²⁶¹ See *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012).

²⁶² See *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014); *Bilski v. Kappos*, 561 U.S. 593 (2010).

discovered a law of nature, natural phenomenon, or abstract idea, might develop an invention applying it, and then, deliberately or otherwise, omit the ineligible subject matter from her specification.²⁶³ This is the kind of scenario for which we would want additional scrutiny from patentable subject matter doctrine. But because the inventor has obscured the nature of her contribution, the Step One “directed to” analysis will not trigger the Step Two “inventive concept” inquiry.

Patent law’s enablement doctrine is a perhaps imperfect safeguard against this kind of evasion. Enablement requires that the specification explain how to make and use the invention.²⁶⁴ This doctrine will make it difficult for an inventor to obtain a patent when she attempts to avoid patentable subject matter scrutiny by omitting relevant information from her specification.

As an example, consider the light bulb. Before Thomas Edison’s work, many other inventors had produced light bulbs.²⁶⁵ They did not work very well. Edison’s core insight was to recognize that filaments—the tiny wires inside incandescent bulbs that produce light when electrons run through them—work better when they are made of high-resistance materials than when they are made of low-resistance ones.²⁶⁶ This principle, which can plausibly be understood as a law of nature, led Edison to a high-resistance filament derived from bamboo.²⁶⁷

Before Edison’s work, however, William Sawyer and Albon Man had obtained a patent including a claim to filaments made “of carbonized fibrous or textile material.”²⁶⁸ By its terms, this claim probably encompassed Edison’s use of bamboo-derived filaments; bamboo is, after all, a fibrous material. But the Court invalidated it because the specification did not explain to a skilled artisan how to choose among the wide range of possi-

²⁶³ We could also imagine an invention that depended upon ineligible subject matter that was as yet unknown. But patentable subject matter analyses can probably safely ignore these scenarios—if the inventor herself does not know what law of nature, natural phenomena, or abstract idea makes her invention possible, it seems unlikely that she will draft a valid patent that limits use of that ineligible subject matter. See *supra* text accompanying notes 246–50.

²⁶⁴ 35 U.S.C. § 112(a) (2012); *In re Wands*, 858 F.2d 731, 735–37 (Fed. Cir. 1988) (explaining that the make and use standard is not met if the skilled artisan must engage in undue experimentation).

²⁶⁵ Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 722–23 (2012).

²⁶⁶ *Id.*

²⁶⁷ *Id.*

²⁶⁸ *The Incandescent Lamp Patent*, 159 U.S. 465, 468 (1895).

ble fibrous materials.²⁶⁹ That is, the Court demanded that Sawyer and Man explain the underlying law of nature that determined whether any given “carbonized fibrous or textile material” would make a good light bulb filament. While Sawyer and Man were unaware of the underlying law of nature, the same idea would apply if they had been aware of it: patentees will find it difficult to satisfy the enablement requirement for claims that would provide practical exclusivity over ineligible subject matter when that subject matter was neither known before the application nor disclosed in the specification.

The second vulnerability is the mirror image of the first: rather than omitting information from the specification, an inventor who discovered ineligible subject matter might falsely attribute its discovery to someone else. Of course, this kind of subterfuge would be improper because the inventor owes a duty of candor in her interactions with the Patent and Trademark Office.²⁷⁰ But suppose that she tried to do it anyway. For such a patent, Step One would indicate that novelty or non-obviousness would prevent the claim from providing practical exclusivity over the ineligible subject matter. A subsequent search for a reference disclosing the ineligible subject matter would, however, come up empty, rendering those doctrines ineffective.

If this inquiry were restricted to the four corners of the patent document, this sort of evasion might work. But because the patentable subject matter inquiry into the relationship between the claim and the state of existing knowledge is a central claiming inquiry, resort to extrinsic evidence may again be appropriate as it would be in claim construction generally.²⁷¹

²⁶⁹ *Id.* at 475–77.

²⁷⁰ 37 C.F.R. § 1.56 (2012). Breach of this duty can render the entire patent unenforceable, although unenforceability now requires a more demanding demonstration of the materiality of the information the applicant withheld or mischaracterized. *See* *Therasense, Inc. v. Becton, Dickinson & Co.*, 649 F.3d 1276, 1293–95 (Fed. Cir. 2011) (en banc) (rejecting the PTO’s Rule 56 standard because it would permit too many claims of inequitable conduct and adopting a but-for materiality standard instead). The duty of candor might also make omission of information as part of the other kind of subterfuge improper. But that presents a slightly more difficult case because applicants generally do not have a duty to affirmatively search for information, only to be forthcoming with the information they do have. 37 C.F.R. § 1.56.

²⁷¹ *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015) (recognizing the possibility that claim construction disputes might require the resolution of underlying questions of fact). Indeed, commentators have criticized the Court’s recent jurisprudence for encouraging courts to decide patentable subject matter questions on motions to dismiss, before there is an opportunity to develop relevant facts in discovery. *See* *Holbrook & Janis*, *supra* note 94, at 362–63.

That extrinsic evidence will contradict the inventor's mischaracterization of what was known. So although inventors might try to avoid courts' efforts to allocate claims to novelty or non-obviousness when those doctrines can serve patentable subject matter goals, the patent system may have effective tools to police such evasion.

C. The Continuing Mystery of the Inventive Concept

Step Two asks whether the "elements of the claim . . . contain[] an inventive concept sufficient to transform" it from a claim on ineligible subject matter "into a patent-eligible application" of that ineligible subject matter.²⁷² In order to know what is sufficient to satisfy Step Two, we would need to identify a claim that was held eligible even though it was directed to ineligible subject matter at Step One. The central claiming perspective suggests that we have been looking for that claim in all the wrong places.

Perhaps because none of its recent quartet explicitly held a claim eligible under Step Two, the Court has repeatedly suggested that its earlier cases—especially *Flook* and *Diehr*—provide sufficient guidance.²⁷³ These suggestions have been met with some skepticism because it is hard to see the difference between *Flook* and *Diehr*, at least if we are looking just to the claim language.²⁷⁴ Both inventions described improvements to industrial processes. The improvements flowed in large part from formulas that more closely monitored the actual conditions obtaining during those processes.²⁷⁵ The corresponding claims—which recited the improved processes without explaining how they differed from preexisting ones—were accordingly nearly indistinguishable.²⁷⁶

But reconsidering *Diehr* and *Flook* from a central claiming perspective reveals that these (admittedly close and tricky) cases might be distinguished as two strands in the ineligible-

²⁷² *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2357 (2014) (internal quotation marks omitted).

²⁷³ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 80–82 (2012); *Alice*, 134 S. Ct. at 2357–59.

²⁷⁴ Chao, *supra* note 10, at 89 ("*Flook* and *Diehr* are simply irreconcilable."); Menell, *supra* note 9, at 1298 (indicating that *Diehr* "effectively overrode *Flook*'s statutory subject matter test").

²⁷⁵ *Diamond v. Diehr*, 450 U.S. 175, 177–79 (1981) (describing the invention as involving the use of constant temperature monitoring to more precisely determine how long a piece of uncured rubber will take to cure); *Parker v. Flook*, 437 U.S. 584, 585–86 (1978) (describing the invention as involving the use of a new formula to monitor the catalytic conversion of hydrocarbons).

²⁷⁶ *Diehr*, 450 U.S. at 179 n.5; *Flook*, 437 U.S. at 596–97.

contributions thread: *Flook* represents a scenario demanding close eligibility scrutiny because the ineligible subject matter is new, while *Diehr* is an example of a claim that might be effectively handled by novelty and non-obviousness instead. In short, while the Court has understood them as Step Two cases, and commentators have accordingly struggled to discern a Step Two difference between them,²⁷⁷ the analysis here instead suggests that *Flook* and *Diehr* reached justifiably different outcomes at Step One.

Start with *Flook*.²⁷⁸ The patent there described a method for ensuring that a catalytic conversion process operates safely and efficiently.²⁷⁹ The key difference between this method and preexisting methods rested in a novel algorithm, developed by the inventor, for recalculating alarm limits while the catalytic conversion was underway.²⁸⁰ The alarm limits were thresholds that, if exceeded, indicated that the conversion process had gone awry.²⁸¹ Because the specification revealed that the inventor's contribution included a new "formula for computing an updated alarm limit," *Flook*'s invention was directed to an abstract idea—the formula—under Step One.²⁸²

Contrast *Flook*'s assessment of the inventor's contribution with that in *Diehr*. The patent in *Diehr* described an improved method of molding rubber.²⁸³ That method required constant measurements of the temperature inside a rubber mold, which a computer would use in combination with the Arrhenius equation to determine when to open the mold.²⁸⁴ The inventors' contribution here did not include the well-known Arrhenius equation; instead, it was to "constantly measur[e] the actual temperature inside the mold."²⁸⁵ Because the inventors did not add the ineligible subject matter to the storehouse of

²⁷⁷ See Lefstin, *supra* note 75, at 572–73. For an effort at reconciling *Flook* and *Diehr* in light of the Court's more recent opinions, see Golden, *supra* note 7, at 1781–94 (suggesting that *Flook*'s warning about conventional elements be read to mean that unconventional elements constitute inventive concepts sufficient to pass Step Two, while conventional elements do not necessarily pass Step Two, but do not necessarily fail it either).

²⁷⁸ 437 U.S. at 584.

²⁷⁹ *Id.* at 585. Although the claim language itself appeared to describe four steps, the Court began by characterizing the invention as a method that "[i]n essence . . . consist[ed] of three steps," evidently collapsing two intermediate steps in the claim into one. *Id.*

²⁸⁰ *Id.* at 585–86.

²⁸¹ *Id.*

²⁸² *Id.* at 585–86, 594–95.

²⁸³ *Diamond v. Diehr*, 450 U.S. 175, 177 (1981).

²⁸⁴ *Id.*

²⁸⁵ *Id.* at 178.

knowledge—Arrhenius did that—the patent was not directed to it.²⁸⁶ We can therefore reconcile *Flook* and *Diehr* by pointing to whether the ineligible subject matter itself—the formula in *Flook* and the Arrhenius equation in *Diehr*—was known before the inventors' work.

Still, the majority's understanding of the *Diehr* inventors' contribution was not inevitable. A different and also plausible reading of the *Diehr* application might have understood the inventors' contribution to include a novel formula—distinct from the Arrhenius equation itself—for calculating when to open the rubber curing mold.²⁸⁷ This reading would have led to the conclusion that the patent was directed to ineligible subject matter under Step One because the inventors' contribution included something that could be understood as an abstract idea: the formula.

Indeed, Justice John Paul Stevens—the author of the opinion in *Flook*—dissented in *Diehr* precisely because of his disagreement regarding which of these plausible readings of the inventors' contribution to adopt. And he explicitly acknowledged that this disagreement was outcome determinative:

As the Court reads the claims in the *Diehr* and Lutton patent application, the *inventors' discovery is a method of constantly measuring the actual temperature inside a rubber molding press*. As I read the claims, *their discovery is an improved method of calculating the time that the mold should remain closed during the curing process*. If the Court's reading of the claims were correct, I would agree that they disclose patentable subject matter. On the other hand, if the Court accepted my reading, I feel confident that the case would be decided differently.²⁸⁸

From Justice Stevens's perspective, what the inventors provided was the formula for "calculating the time that the mold should remain closed,"²⁸⁹ subject matter that appears quite close to that in *Flook*. But, as Justice Stevens acknowledges, the majority viewed the contribution as a "method of constantly measuring the actual temperature inside a rubber molding press."²⁹⁰ While prior methods of curing rubber perhaps measured temperature only intermittently, the inventors here measured it constantly. It was therefore not the Arrhe-

²⁸⁶ *Id.* at 177–78 & n.2.

²⁸⁷ *Id.* at 206–07 (Stevens, J., dissenting).

²⁸⁸ *Id.* (emphasis added) (footnotes omitted).

²⁸⁹ *Id.*

²⁹⁰ *Id.*

nius equation or even the formula for calculating the time to open the mold that distinguished the inventors' work from what came before; instead, it was the frequency of temperature measurement.²⁹¹ Taking the *Diehr* majority's (plausible though not inevitable) view that the contribution comprised the constant measurement of temperature, we can reconcile *Flook* and *Diehr* as reaching different outcomes at Step One, not Step Two. The contribution in *Flook* included the identification of ineligible subject matter; the contribution in *Diehr* did not.

If the Court is wrong to suggest that *Diehr* provides an example of an inventive concept, perhaps we should turn to *Myriad*.²⁹² After all, *Myriad* is the only case in the Court's recent quartet to hold that a claim satisfied the eligibility requirement.

Still, this is an odd place to turn for Step Two guidance. Although *Myriad* was decided one year after *Mayo*, the *Mayo* framework played no overt role in the Court's analysis.²⁹³ And *Alice* seemingly furthered the distance between *Myriad* and *Mayo*; as *Alice* illustrated the continuity of the Court's jurisprudence by fitting its precedents within the *Mayo* framework, it somehow skipped *Myriad*—decided just one term prior—in favor of cases decided decades ago.²⁹⁴ We don't have a good answer for why *Myriad* ignored *Mayo* and why *Alice*, in turn, ignored *Myriad*. But if we take seriously *Alice*'s insistence that the Court's patentable subject matter cases can all be understood within the *Mayo* framework, then it's worth spending some time on *Myriad*.

The case concerned patents that *Myriad* obtained related to its research on the BRCA1 and BRCA2 genes.²⁹⁵ Women with certain mutations in these genes have an elevated risk of

²⁹¹ *Id.* at 179 (“According to the respondents, the continuous measuring of the temperature inside the mold,” *inter alia*, was “new in the art.”).

²⁹² *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013).

²⁹³ *Myriad* managed to cite *Mayo* only three times and never for the two-step subject matter analysis it ostensibly articulated. One cite noted that the Court granted the petition for certiorari in *Myriad*, vacated the judgment, and remanded for reconsideration in light of *Mayo*. *Myriad*, 133 S. Ct. at 2114. Another cite was for the general proposition that Section 101 excludes laws of nature, abstract ideas, and natural phenomena. *Id.* at 2116. And the last was in a footnote for the proposition that concerns about reliance interests regarding PTO determination are better directed to Congress than the courts. *Id.* at 2119 n.7; see also Dan L. Burk, *The Curious Incident of the Supreme Court in Myriad Genetics*, 90 NOTRE DAME L. REV. 505, 506 (2014) (describing “the Court’s deafening silence on this relationship”).

²⁹⁴ *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2357–59 (2014).

²⁹⁵ *Myriad*, 133 S. Ct. at 2112.

breast and ovarian cancer.²⁹⁶ One set of claims in *Myriad* covered “isolated DNA.”²⁹⁷ Representative claim 1, for example, recited “isolated DNA coding for a BRCA1 polypeptide.”²⁹⁸

Consistent with a central claiming approach, the Court first turned to the specification to ascertain what the inventor contributed to the storehouse of knowledge.²⁹⁹ Before *Myriad*’s work, “scientists knew that heredity played a role in establishing a woman’s risk of developing breast and ovarian cancer, but they did not know which genes were associated with those cancers.”³⁰⁰ “*Myriad*’s principal contribution was uncovering the precise location and genetic sequence of the BRCA1 and BRCA2 genes within chromosomes 17 and 13.”³⁰¹

The question, then, was “whether *this* renders the genes patentable.”³⁰² The “*this*” refers to “*Myriad*’s principal contribution”: the “uncovering [of] the precise location and genetic sequence of the BRCA1 and BRCA2 genes.”³⁰³ The ineligible subject matter was “[t]he location and order of the nucleotides,” which “existed in nature before *Myriad* found them.”³⁰⁴ Although not framed in *Mayo*’s terms, the fact that the Court characterized *Myriad*’s “principal contribution” as “uncovering” something that “existed in nature” suggests that *Myriad*’s claims were directed to ineligible subject matter under Step One.

The Court then concluded that the isolated DNA claims were ineligible.³⁰⁵ Because the claims were “concerned primarily with the information contained in the genetic *sequence*, not with the specific chemical composition of a particular molecule,” there was nothing new in the isolated DNA claims that could save them.³⁰⁶ The isolated DNA claims therefore cannot be examples of inventive concepts—they were apparently directed to ineligible subject matter under Step One and did not contain an inventive concept under Step Two.³⁰⁷

296 *Id.*

297 *Id.* at 2113.

298 *Id.*

299 It was the specification that said that “the location of the gene was unknown until *Myriad* found it,” and it was also the specification that “indicate[d] that *Myriad* found the location” of the BRCA1 and BRCA2 genes. *Id.* at 2117–18.

300 *Id.* at 2112.

301 *Id.* at 2116.

302 *Id.* (emphasis added).

303 *Id.*

304 *Id.*

305 *Id.* at 2116–19.

306 *Id.* at 2118.

307 John Golden makes a related argument; he suggests that the fact that *Myriad* wrote its claims in terms of “their genetic sequences,” instead of “specific

Another set of claims covered complementary DNA (“cDNA”).³⁰⁸ cDNA is not part of the ordinary cellular process that starts with DNA in the chromosome and ends with proteins. To make proteins, cells convert DNA in the chromosome, also known as genomic DNA (“gDNA”), into RNA.³⁰⁹ RNA is similar to DNA, but it has a ribose backbone instead of deoxyribose, and it substitutes DNA’s thymine (T) nucleotides with uracil (U) ones.³¹⁰ gDNA includes both exons—the nucleotides describing the amino acids that will ultimately comprise the protein of interest—and introns—the nucleotides that are removed during protein synthesis.³¹¹ During the gDNA to RNA conversion, cells remove the introns; RNA’s nucleotide sequence therefore mirrors the corresponding gDNA sequence, but with only the exons remaining.³¹²

Because geneticists are sometimes more interested in the exons than the introns, RNA can be more helpful than gDNA. But RNA is less stable than DNA, so lab technicians make synthetic cDNA from the naturally-occurring RNA.³¹³ cDNA is just like gDNA except it has only exons, not introns and exons (and, of course, it is not incorporated into the larger genome).³¹⁴ And although both cDNA and RNA include only exons, cDNA’s nucleotide sequence has thymine (T) where RNA’s would have uracil (U).

The Court ultimately concluded that *Myriad*’s cDNA claims were eligible.³¹⁵ The challenge of *Myriad* is to determine whether the cDNA claims survived because they were not directed to ineligible subject matter at Step One or because, even though they were directed to ineligible subject matter, they contained an inventive concept under Step Two. Again, the Court’s analysis was brief and worth quoting in full:

cDNA does not present the same obstacles to patentability as naturally occurring, isolated DNA segments. As already explained, creation of a cDNA sequence from mRNA results in an exons-only molecule that is not naturally occurring. Petitioners concede that cDNA differs from natural DNA in that

chemical compositions” indicated to the Court that chemical differences between the isolated and genomic DNA could not constitute the requisite “inventive act.” See *Golden*, *supra* note 7, at 1786.

³⁰⁸ *Myriad*, 133 S. Ct. at 2119.

³⁰⁹ *Id.* at 2111–12.

³¹⁰ *Id.*

³¹¹ *Id.* at 2111.

³¹² *Id.*

³¹³ *Id.* at 2112.

³¹⁴ *Id.* at 2111–12.

³¹⁵ *Id.* at 2119.

the non-coding regions have been removed. They nevertheless argue that cDNA is not patent eligible because the nucleotide sequence of cDNA is dictated by nature, not by the lab technician. That may be so, but the lab technician unquestionably creates something new when cDNA is made. cDNA retains the naturally occurring exons of DNA, but it is distinct from the DNA from which it was derived. As a result, cDNA is not a product of nature and is patent eligible under § 101, except insofar as very short series of DNA may have no intervening introns to remove when creating cDNA. In that situation, a short strand of cDNA may be indistinguishable from natural DNA.³¹⁶

As a central claiming perspective reveals, both the isolated DNA claims and the cDNA claims arose from the inventors' identification of the BRCA1 and BRCA2 sequences—that is, Myriad's core contribution was to identify the order of nucleotides that make up BRCA genes as they exist in gDNA.³¹⁷ Because all of Myriad's claims arose from its identification of the BRCA sequences, they are all directed to it under Step One.

The difference between the claims thus lies at Step Two. The isolated DNA claims recited exactly the nucleotide sequence that exists in nature. Because that sequence is itself ineligible and there was nothing else in the claim, there was no inventive concept.³¹⁸

In contrast, Myriad's cDNA claims described different sequences of nucleotides, ones that do not exist in nature: the ones that comprise only the BRCA1 and BRCA2 exons. These were directed to ineligible subject matter under Step One insofar as the contribution underlying them—discovering the BRCA nucleotide sequences—comprised a natural phenomenon.³¹⁹ But they satisfied Step Two because the specific order of particular nucleotides described in them cannot be found in naturally-occurring gDNA. In other words, the cDNA claims survived because the claim limitations described something other than the ineligible subject matter itself, and that something had not existed before the inventors' work.

This is perhaps the crucial difference between *Myriad* and *Mayo*, the two recent cases that represent the ineligible-contributions thread. While the only novelty in the *Mayo* claims resided in the ineligible subject matter itself, the novelty in the *Myriad* cDNA claims rested in the exons-only sequence of nu-

³¹⁶ *Id.* (internal quotation marks, brackets, footnotes, and citations omitted).

³¹⁷ *Id.* at 2116–17.

³¹⁸ *Id.* at 2118.

³¹⁹ *Id.* at 2116–17.

cleotides, which was not itself the ineligible subject matter to which the claims were directed.

To be sure, the Court could have (and perhaps should have) reached the opposite conclusion.³²⁰ Even if the genetic information encoded in cDNA is not the same as the genetic information encoded in gDNA, it is probably the same as that encoded in RNA. The naturally-occurring exons-only RNA sequence simply replaces each cDNA thymine with a uracil. From this view, perhaps the ineligible subject matter to which the cDNA was directed should have been the RNA corresponding to BRCA gDNA, rather than the BRCA gDNA that the isolated claims were directed to.

But at least the central claiming approach reveals that the distinction between Myriad's isolated DNA and cDNA claims must be found in how we understand the thing the inventor contributed rather than the precise language used in the claims.³²¹ Because the Court appears to have understood the inventor's contribution as identifying a specific "sequence of nucleotides" in gDNA,³²² it was able to distinguish the isolated DNA claims from the cDNA ones and it was able to distinguish the cDNA claims from naturally-occurring gDNA (which includes introns that cDNA does not).³²³ The isolated DNA claims did not change the genetic information from what was found in nature; the cDNA claims (plausibly) did. The former therefore did not contain an inventive concept, while the latter did.

IV

CENTRAL CLAIMING BEYOND ELIGIBILITY

Three core patent law doctrines—novelty, non-obviousness, and literal infringement—still proceed along largely peripheral claiming lines. But the patent system can no longer

³²⁰ See Burk, *supra* note 293, at 508 (arguing that, to the extent that the isolated DNA claims fell because their "coding information" was identical to that of gDNA, the cDNA claims should also have fallen because they "code for exactly the same gene product as the gDNA").

³²¹ Cf. Golden, *supra* note 7, at 1786–87 (arguing that *Myriad* indicates that the inventive concept question "seems largely to be code for the question of whether there is a 'marked difference' between the claimed invention and excluded subject matter").

³²² *Myriad*, 133 S. Ct. at 2114.

³²³ This suggests that we could read the *Myriad* Court as applying the version of the "inventive application" test that Jeffrey Lefstin argues *Neilson* actually applied, rather than the misunderstanding of that test introduced in *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948) and adopted in *Parker v. Flook*, 437 U.S. 584 (1978). See Lefstin, *supra* note 78, at 580–87.

be described as entirely or even predominantly a peripheral claiming one. Most importantly, central claiming plays a key role in patentable subject matter, which, after decades of desuetude, is now rivaled only by non-obviousness for the title of most important validity doctrine.³²⁴ As others have noted, central claiming is also found in the doctrine of equivalents and in means-plus-function claiming.³²⁵ Several other doctrines—including inventorship, inequitable conduct, and contributory infringement—use a point of novelty approach.³²⁶ It is probably fairest to say now that the pendulum has swung away from the near-total peripheral claiming end of the spectrum and is moving towards the central claiming end.

It therefore makes sense to consider at this point how far the pendulum should swing. To demonstrate some of the possibilities, I show here how central claiming approaches might improve three other problematic areas of patent law: exhaustion, divided infringement, and written description. These examples should be understood as merely suggestive and illustrative—a complete exploration of all the patent law issues that could benefit from central claiming is beyond the scope of this Article.³²⁷ The point for now is simply that we have shifted away from the long-dominant peripheral claiming system, and there are surely more possibilities in store for the central claiming renaissance.

A. Exhaustion

The exhaustion rule provides that the first sale of a product embodying the invention terminates the patentee's rights as to

³²⁴ See Holbrook & Janis, *supra* note 94, at 354–85 (describing the “eligibility-as-king” model).

³²⁵ See Burk & Lemley, *supra* note 11, at 1772–74; Fromer, *supra* note 11, at 735–39. While these two areas are not at the fringes of patent law, they are not at the core either. See Chiang, *supra* note 176, at 1103 n.28 (characterizing the doctrine of equivalents as an exception to the literal infringement rule and noting that the “element-by-element comparison” keeps the doctrine “within the strictures of the claim language”).

³²⁶ Bernard Chao, *Breaking Aro's Commandment: Recognizing that Inventions Have Heart*, 20 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 1183, 1195–96 (2010); Lemley, *supra* note 37, at 1261–63.

³²⁷ For example, an effort to apply central claiming beyond eligibility would have to confront the tension it would create with cases that seem to require at least some aspects of peripheral claiming in the infringement analysis. See *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997) (concluding that the doctrine of equivalents must be applied on an element-by-element basis).

that product.³²⁸ So if I buy a car incorporating many patented technologies, I can resell it without asking for anyone's permission.³²⁹ The basic intuition is that the patentee can capture the full value of her invention at the first sale, so her patent rights should not extend beyond it.³³⁰ This rule is easy enough to understand when the patentee sells the precise product covered by the patent. But what happens when she sells a product that incorporates less than all of the elements of the claimed invention?

The Supreme Court addressed this question in *Quanta Computer, Inc. v. LG Electronics, Inc.*³³¹ The patentee, LG Electronics ("LGE"), entered into an agreement permitting Intel to manufacture computer products.³³² Intel then sold its products to Quanta.³³³ Intel's products did not themselves include all elements of the LGE patents; Quanta, however, combined them with other non-Intel parts so that they performed all the elements in the LGE claims.³³⁴ LGE sued Quanta for infringement, and Quanta raised an exhaustion defense. The question was accordingly whether LGE's deal with Intel exhausted LGE's patent rights with respect to the products Intel sold Quanta,

³²⁸ Assuming, of course, that the sale is authorized. *Quanta Comput., Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 625 (2008); see Richard A. Epstein, *The Disintegration of Intellectual Property? A Classical Liberal Response to a Premature Obituary*, 62 STAN. L. REV. 455, 505 (2010) ("In its traditional form, the doctrine holds that the power of the patent is exhausted after its initial unrestricted sale, so that all future takers of the patented article take free and clear of any patent restriction.").

³²⁹ Anyone who owns a patent covering a technology embodied in the car, that is. I might have to get other people's permission: my wife would be upset if I sold our car without telling her first.

³³⁰ As always, the basic intuition does not resolve the hard questions. Commentators who support a robust exhaustion rule argue that it ensures patent law does not contravene common law rules limiting restraints on alienation. See Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 114–15 (2004) (describing patent "exhaustion [as] similar to the prohibition of restraints on alienation"); Molly Shaffer Van Houweling, *The New Servitudes*, 96 GEO. L.J. 885, 911–14 (2008) (arguing that the roots of patent law's exhaustion rule lie in skepticism about chattel servitudes). Skeptics suggest that exhaustion improperly interferes with the efficient contractual arrangements that sophisticated entities might prefer. See Epstein, *supra* note 328, at 507–09 (arguing that absent antitrust concerns, patent law should not interfere with restrictions on subsequent sales of patented goods). Alternatively, exhaustion might be better understood as ensuring that patent law—and its particular remedies—do not interfere with other areas of the law, like ordinary contract and commercial law. John F. Duffy & Richard Hynes, *Statutory Domain and the Commercial Law of Intellectual Property*, 102 VA. L. REV. 1 (2016).

³³¹ 553 U.S. 617 (2008).

³³² *Id.* at 623.

³³³ *Id.* at 624.

³³⁴ *Id.*

even though the Intel products did “not fully practice any of the patents at issue.”³³⁵

The peripheral claiming answer should be simple: no. The scope of the patent reaches only things that fall within the boundaries set by the claim language. A product that does not incorporate each element identified in the claim is simply not the claimed invention.³³⁶ Because the Intel products did not include all the claimed elements, a peripheral claiming perspective should conclude that LGE’s deal with Intel was not a sale of the claimed invention, and therefore should not exhaust LGE’s rights.³³⁷

But the Court did not give this easy peripheral claiming answer. Instead, it concluded that LGE’s patent rights were exhausted by its deal with Intel for two reasons. First, Intel’s products “substantially embodie[d] the patent[s]” because they included “[e]verything inventive about each patent,” missing only features that were “common and noninventive.”³³⁸ Second, Intel’s products were only useful as part of the patented invention.³³⁹ Combined, these conditions suggest that the Court read the scope of the patent to be implicated by LGE’s sale of a product that reflected its contribution to the storehouse of knowledge—“[e]verything inventive about each patent.”³⁴⁰ A product that embodies everything inventive about the claimed invention is a fairly close approximation to central claiming’s search for the inventor’s contribution and, importantly, is inconsistent with peripheral claiming’s reliance on claim language to define the outermost reach of the patent.

It is possible to read the Court’s analysis as a point of novelty one, rather than a central claiming one.³⁴¹ Unlike a central claiming approach, the Court did not attend closely to the inventor’s description of her contribution in the specification. Still, unlike a point of novelty approach, it also did not appear to pay much attention to the structure of the claim either.

³³⁵ *Id.*

³³⁶ See Lemley, *supra* note 37, at 1259.

³³⁷ Note also that there is an appealing symmetry here. In a peripheral claiming system, the patentee cannot pursue patent remedies when someone sells a product that incorporates less than all of the claimed elements. Similarly, the patentee should not lose her ability to pursue patent remedies when she herself sells that same product.

³³⁸ *Quanta Comput.*, 553 U.S. at 633–34.

³³⁹ *Id.*

³⁴⁰ *Id.*

³⁴¹ See Chao, *supra* note 326, at 1229–32; Lemley, *supra* note 37, at 1264.

To the extent that *Quanta* leaves open both possibilities, courts should adopt a more complete central claiming approach. Exhaustion can be undermined by patentee opportunism, as an analogy to the doctrine of equivalents demonstrates. That doctrine recognizes that claim language will leave inevitable loopholes, and it seeks to prevent unscrupulous rivals from avoiding liability by making trivial variations that exploit such loopholes.³⁴² In much the same way, a patentee could avoid exhaustion by making trivial variations that exploit inevitable loopholes in claim language. Indeed, the danger of patentee opportunism is even more severe than that of rivals' opportunism because the patentee herself is responsible for drafting the claims. She might, then, build the loopholes in at the outset to facilitate her subsequent opportunism. And point of novelty approaches that still insist on some fidelity to claim structure may be undermined by the patentee's control over that structure in the first place.

A central claiming approach to the exhaustion trigger could make such opportunism much more difficult. Central claiming permits courts to make case-by-case assessments of the proximity of some object to the inventor's core contribution.³⁴³ When it is clear that the patentee is engaged in the kind of opportunism described above, courts may more readily conclude that her patent rights are exhausted; if not, courts should be more skeptical of exhaustion defenses.

Moreover, the cost of flexible central claiming approaches is usually understood to be the possibility that the public received inadequate notice about the scope of the patent.³⁴⁴ That cost is probably minimal because, as explained above, peripheral claiming has not fared much better on the notice front.³⁴⁵ But to the extent that the concern is valid, it is diminished when we consider the inventor's own activities because the inventor herself cannot much complain that she was unaware of the scope of her own patent. Of course, in a central claiming world, there may be extreme cases in which courts read the patent so unmoored even from the inventor's contribution that the patentee can fairly say she could not have anticipated that her activities would trigger the exhaustion rule. Still, the more

³⁴² *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607–08 (1950).

³⁴³ See *Burk & Lemley*, *supra* note 11, at 1782–83; *Fromer*, *supra* note 11, at 733.

³⁴⁴ See *Fromer*, *supra* note 11, at 761–63.

³⁴⁵ See *supra* text accompanying notes 61–65.

ordinary scenarios appear to be well-suited to the flexibility that central claiming might provide.

B. Divided Infringement

Suppose a patent claims a method incorporating five steps. A single entity that performs all five of those steps is liable for direct infringement.³⁴⁶ Simple enough. Now suppose that one entity performs the first three steps, and another performs the last two steps. So all five steps of the claimed method are being performed, but no single entity is performing all five steps of the claimed method. This is the divided infringement scenario.³⁴⁷ The Supreme Court recently acknowledged that divided infringement cannot give rise to direct liability, but it signaled an interest in revisiting this rule in an appropriate case.³⁴⁸ And it should.

Divided infringement poses an increasingly important problem for the patent system.³⁴⁹ From the patentee's perspective, divided infringement can undermine the patent's value in much the same way that ordinary direct infringement does.³⁵⁰ The benefits of the invention might be equivalently enjoyed whether the five steps are being performed by one entity acting alone or two entities acting independently. Indeed, there may be some inventions that by their nature must be

³⁴⁶ 35 U.S.C. § 271(a) (2012).

³⁴⁷ See *Limelight Networks, Inc. v. Akamai Techs., Inc.*, 134 S. Ct. 2111, 2115 (2014); *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328–29 (Fed. Cir. 2008).

³⁴⁸ *Limelight*, 134 S. Ct. at 2120. The Court there addressed the narrow question whether indirect liability could be imposed without an underlying act of direct infringement. *Id.* at 2115. In rejecting that possibility, the Court noted that direct infringement does not occur when “a method’s steps have not all been performed as claimed by the patent unless they are all attributable to the same defendant” *Id.* at 2117; see also Michael A. Carrier, *Limelight v. Akamai: Limiting Induced Infringement*, 2014 WIS. L. REV. ONLINE 1, 6, <http://wisconsinlawreview.org/wp-content/uploads/2014/07/Carrier-WLR-Online-Final.pdf> [<https://perma.cc/BQ5E-SBCM>] (“A reevaluation of the Federal Circuit’s rule nonetheless seemed to be an option suggested by the Court’s continued reminders that it was assuming the validity of *Muniauction*.”).

³⁴⁹ See Mark A. Lemley, David O’Brien, Ryan M. Kent, Ashok Ramani & Robert Van Nest, *Divided Infringement Claims*, 33 AIPLA Q.J. 255, 256 (2005) (noting rise in patents related to computing networks as driving increased importance of patents covering multi-user activity); W. Keith Robinson, *Economic Theory, Divided Infringement, and Enforcing Interactive Patents*, 67 FLA. L. REV. 1961, 1977–81 (2015) (describing internet and personalized medicine inventions that pose divided infringement problems).

³⁵⁰ See Robinson, *supra* note 349, at 2015–20 (evaluating various tests for divided infringement from the perspective of reward theory).

performed by multiple entities.³⁵¹ So rivals might structure their activities to avoid liability while at the same time capturing the value of the invention.

From the accused infringers' perspective, however, imposing liability in these scenarios could make her liable for engaging in well-known, routine activity that predated the invention. Suppose the accused infringer only took the first three steps precisely because she knew that those three steps were well known in her field. She did not want whatever improvement the claimed five-step method offered, at least not at the price the patentee demanded. But if another entity took the other two steps, she could be held liable (assuming divided infringement gave rise to liability) even though she was careful not to perform the claimed invention.³⁵²

Crucially, the patentee did not seek, much less obtain, a patent covering only the first three steps. And perhaps for good reason; the first three steps standing alone might have been commonplace before the inventor's work. The accused infringer is therefore rightly concerned about being at the mercy of unknown third parties who independently perform the other two steps, thus exposing her to liability for doing something over which the patentee obtained no rights.

Some scholars suggest that the problem of divided infringement is illusory, or at least a problem of the patentee's own making.³⁵³ On this view, the real source of the problem is poor claim drafting.³⁵⁴ Patentees should simply draft claims so that all of the steps would be performed by a single entity.³⁵⁵ In

³⁵¹ See Lemley et al., *supra* note 349, at 258 (asking who could be held liable when a patent claims an invention "that cannot be performed by one person").

³⁵² See *id.* at 262 (arguing that imposing liability in divided infringement scenarios would undermine indirect infringement's intent requirements); see also Mark D. Janis & Timothy R. Holbrook, *Patent Law's Audience*, 97 MINN. L. REV. 72, 116–20 (2012) (arguing that divided infringement doctrine should avoid catching unwitting members of the public within the liability net); Dmitry Karshedt, *Causal Responsibility and Patent Infringement*, 70 VAND. L. REV. 565, 636–41 (2017) (arguing that tort concepts of causation can be used to distinguish scenarios where entities should be held liable from those where they should not).

³⁵³ See Lemley et al., *supra* note 349, at 282 (arguing that divided infringement should not give rise to liability because the problem "can be avoided by proper patent drafting" and because "infringement is a strict-liability offense").

³⁵⁴ See *id.* at 272–73.

³⁵⁵ For example, an invention requiring that a server and a client send and receive information could be written so that each step is performed by independent entities or by a single entity. The former would look something like this: (1) transmit information to a server; (2) add the transmitted information to a database of client requests. That claim would require an act taken by a client ("transmit information") and a server (add information to a database). The latter would look something like this: (1) receive information from a client; (2) add the

other words, to the extent that claims are drafted in a way that makes it possible for several independent entities to perform the steps of a method claim, the solution is to close that loop-hole by drafting the claims better.

This argument, however, imagines that there is something special about the particular way in which claims are drafted. Alternatively, it implicitly suggests that a contrary rule presents too great a risk of imposing liability on those who are merely making or selling commonplace components that predated the invention.³⁵⁶

Central claiming, however, rightly rejects both of these ideas. There is not (too) much that is special about the precise structure used by the inventor's lawyers to draft the claims; instead, what matters is what the inventor has contributed. And there is little risk of imposing liability on those engaged in ordinary commerce so long as the focus is kept on what the inventor has given to the world. The divided infringement problem can therefore be solved more readily by incorporating pragmatic assessments of the inventor's contribution into the definition of patent scope.

C. Written Description

Written description requires that the specification disclose to a skilled artisan that the inventor had possession of the invention when the patent was filed.³⁵⁷ In the Federal Circuit's view, the inquiry is designed to ensure that "the inventor actually invented the invention claimed."³⁵⁸ While the doctrine is not without its defenders,³⁵⁹ it has been the target of significant criticism.³⁶⁰

received information to a database of client requests. Here, all the acts would have to be taken by the server. See *id.*

³⁵⁶ See *id.* at 282.

³⁵⁷ 35 U.S.C. § 112 (2012); *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010).

³⁵⁸ *Ariad*, 598 F.3d at 1351.

³⁵⁹ See, e.g., Michael Risch, *A Brief Defense of the Written Description Requirement*, 119 YALE L.J. ONLINE 127, 133–35 (2010), https://www.yalelawjournal.org/pdf/867_hcenirrop.pdf [<https://perma.cc/236X-8TDT>] (providing a defense of a separate written description requirement grounded in principles of statutory interpretation).

³⁶⁰ See Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 161–63 (2006) (criticizing the modern written description requirement as redundant); Mark D. Janis, *On Courts Herding Cats: Contending with the "Written Description" Requirement (and Other Unruly Patent Disclosure Doctrines)*, 2 WASH. U. J.L. & POL'Y 55, 62–69 (2000) (arguing that the distinct written description requirement is a historical artifact producing incoherence among modern disclosure requirements); Allen K. Yu, *The En Banc Federal Circuit's Written Description*

The critics have a point: written description is an odd requirement in a peripheral claiming regime. If the invention is whatever the claims say it is, then in what sense would the inventor have possessed it (or not)?³⁶¹ And the modern articulation of written description fits awkwardly alongside enablement, which requires that the specification teach a skilled artisan how to make and use the claimed invention.³⁶² Although the Federal Circuit has held that these are two distinct requirements,³⁶³ there appears to be substantial overlap between a disclosure that reveals that the inventor possessed the invention and a disclosure that teaches someone how to make and use the invention.³⁶⁴ Intuitively, it would be difficult for the patentee to teach a skilled artisan how to make and use an invention if the patentee had not already made the invention herself.³⁶⁵ Scholars have accordingly argued that, in our peripheral claiming regime, we could safely jettison this redundant version of the written description requirement.³⁶⁶

The doctrine might, however, have a meaningfully distinct role to play in an ascendant central claiming regime. The written description requirement traces its origins to the Patent Act of 1790, which demanded that the specification “not only . . . [1] distinguish the invention or discovery from other things before known and used, but also . . . [2] enable a workman or other person skilled in the art or manufacture, . . . to make, construct, or use the same”³⁶⁷ The requirement grew out of

Requirement: Time for the Supreme Court to Reverse Again?, 33 CARDOZO L. REV. 895, 900–20 (2012).

³⁶¹ See Jeffrey A. Lefstin, *The Formal Structure of Patent Law and the Limits of Enablement*, 23 BERKELEY TECH. L.J. 1141, 1198 (2008) (“[O]nce the concepts of ‘invention’ and ‘claim’ became essentially synonymous in patent law, the notion of ‘possessing the invention’ became a logical impossibility except as a rephrasing of the ultimate legal conclusion.”).

³⁶² 35 U.S.C. § 112(a) (2012); *In re Wands*, 858 F.2d 731, 735–37 (Fed. Cir. 1988).

³⁶³ *Ariad*, 598 F.3d at 1345 (holding that Section 112 contains a “written description requirement separate from an enablement requirement”).

³⁶⁴ See Holbrook, *supra* note 360, at 162; Yu, *supra* note 360, at 910–11.

³⁶⁵ See Chiang, *supra* note 176, at 1113 (“Although phrased as two separate requirements, in practice the enablement and written description requirements are basically coextensive.” (footnote omitted)).

³⁶⁶ See Janis, *supra* note 360, at 63–64 (arguing that the historical justification for a written description requirement “to put the public on notice as to what the patentee considered to be the protected invention . . . does not provide compelling justification for the written description requirement” as applied today); Yu, *supra* note 360, at 905–06 (explaining that the “written description requirement of the late eighteenth century . . . served the function that is today served by claims” and contending that a written description requirement of that kind “descended into irrelevance”).

³⁶⁷ Act of Apr. 10, 1790, ch. 7, 1 Stat. 109, 110 (repealed 1793).

the first demand that the specification “distinguish the invention” from what was known before.³⁶⁸ In the then-prevailing central claiming regime, this made sense because the scope of the inventor’s rights was set by distinguishing the invention from the prior state of knowledge. The enablement requirement, meanwhile, grew out of the second demand that the specification “enable” a “person skilled in the art . . . to make, construct, or use” the invention.³⁶⁹ This demand is justified as part of the patent bargain, by which the patentee discloses useful information—people working in the field can take advantage of the patent’s disclosure to develop their own inventions, and to build the patented invention once the patent expires—in exchange for the exclusivity a patent provides.³⁷⁰

A resurgence in central claiming offers an opportunity to rehabilitate the written description requirement. A central claiming regime demands that the inventor describe the invention itself (as opposed to describing how to make and use it) to provide a basis for answering questions regarding the scope of the patent.³⁷¹ Even if we continue to apply a peripheral claiming approach to questions of direct infringement, the patent system is now using central claiming principles to resolve at least questions of patentable subject matter, infringement under the doctrine of equivalents, and mean-plus-function claim scope; it could soon apply them to exhaustion triggers and divided infringement too.

In order for these areas to work well, we need specifications that identify the invention and distinguish it from what came before. That is precisely what the written description was originally designed to do, and what it ought to be redirected to do again. This would entail shifting the analysis from whether a skilled artisan would acknowledge the inventor’s possession of the invention—however “possession” is understood—to whether the inventor has appropriately distinguished her work from what came before. A return to written description’s original role—vestigial in a peripheral claiming system, but crucial

³⁶⁸ *Id.*; see *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 433–34 (1822); Yu, *supra* note 360, at 905.

³⁶⁹ Act of Apr. 10, 1790, ch. 7, 1 Stat. 109, 110 (repealed 1793); see *Evans*, 20 U.S. (7 Wheat.) at 433.

³⁷⁰ Jason Rantanen, *The Doctrinal Structure of Patent Law’s Enablement Requirement*, 69 VAND. L. REV. 1679, 1680 (2016).

³⁷¹ See Yu, *supra* note 360, at 905 (explaining that the written description requirement at the time *Evans* was decided had the function that claims do today—to “clearly delineate what an invention covers”—and that this flowed from the patent system’s use of central claiming at the time).

in a central claiming one—could solve the problem of the doctrine's overlap with enablement and facilitate a more thoroughgoing application of central claiming principles.

V

CONCLUSION

This Article's core contribution has been to reveal the Court's use of central claiming in its patentable subject matter jurisprudence. This turn to central claiming has probably been a salutary development—it lays the foundation for a sensible approach to patent eligibility by mitigating the levels of abstraction problem that had plagued peripheral claiming approaches to eligibility. And viewing the Court's jurisprudence through a central claiming lens improves our understanding of the substantive law of patent eligibility, revealing distinct threads in the cases and casting new light on troublesome precedent. Finally, taking the Court's use of central claiming as heralding a more general shift away from peripheral claiming, this Article concluded by exploring additional opportunities for central claiming in exhaustion, divided infringement, and written description. While the Court's work on the substantive eligibility requirement has attracted the most attention, the central claiming renaissance lurking beneath it may prove the more lasting influence.