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THE *MYRIAD* REASONS TO HIT “RESET” ON PATENT-ELIGIBILITY JURISPRUDENCE

*Alan J. Heinrich & Christopher T. Abernethy**

This Article explores the Supreme Court’s recent decision in Association for Molecular Pathology v. Myriad Genetics, Inc. in the historical context of the Court’s jurisprudence regarding the scope of patent-eligible subject matter under 35 U.S.C. § 101, including the broad, judicially created “exceptions” to the statute which exclude “laws of nature, physical phenomena, and abstract ideas” from patent eligibility. The authors posit that the Myriad decision was a significant departure from the Court’s prior jurisprudence regarding patent-eligible subject matter. The authors welcome this departure and contend that Myriad more accurately adhered to the letter and the spirit of § 101 than did many of the Court’s prior rulings. The authors further propose that Myriad’s bright-line test for patent eligibility can provide a foundation for a clear and workable framework, grounded firmly in statute, that would at last bring order and consistency to an area of patent law that has long been riddled with confusion and uncertainty.

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I. INTRODUCTION

On June 13, 2013, the Supreme Court decided *Association for Molecular Pathology v. Myriad Genetics, Inc.*,¹ its latest decision on the scope of patent-eligible subject matter under 35 U.S.C. § 101. In *Myriad*, the Court considered the patent eligibility of claims directed to human DNA sequences. The patentee had discovered the sequence and precise location on chromosomes 13 and 17 of two genes (BRCA1 and BRCA2) that, when mutated, are associated with a substantial increase in an individual's risk of developing breast and ovarian cancer.² The Court decided the case by applying a bright-line rule. The Court held that naturally occurring DNA sequences are not patent eligible, but that non-naturally occurring DNA sequences (known as complementary DNA, or "cDNA"), which are synthesized using well-known laboratory techniques, are patent eligible.³

The thesis of this Article is twofold. First, we posit that *Myriad*'s bright-line rule on patent eligibility sharply conflicts with much of the Court's modern § 101 jurisprudence—including, in particular, with the Supreme Court's immediately preceding foray into patent eligibility in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*⁴ Second, we posit that *Myriad* was "correctly decided"—that is, decided in accordance with the letter and spirit of § 101 itself.

In ruling that cDNA is patent eligible, the *Myriad* Court abandoned two primary judicial glosses on § 101 from prior Supreme Court case law—the "inventive concept" and "preemption" analyses. The *Myriad* Court did not ask whether the patentee's claims to cDNA included an "inventive concept" beyond the discovery of the patent-ineligible isolated genes and the use of conventional laboratory techniques to synthesize cDNA from those genes. Nor did the *Myriad* Court consider whether, and to what extent, allowing claims directed to cDNA would "preempt" further exploitation and

1. 133 S. Ct. 2107 (2013).

2. *Id.* at 2112–13.

3. *Id.* at 2111 ("[W]e hold that a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated, but that cDNA is patent eligible because it is not naturally occurring."); *id.* at 2116–19.

4. 132 S. Ct. 1289 (2012).

investigation of the patentee's discovery of the patent-ineligible isolated genes. This Article proposes that *Myriad's* abandonment of those judicial glosses presents an opportunity for the Supreme Court to hit "reset" on its § 101 jurisprudence in future cases.

It is hardly a matter of controversy to observe that § 101 case law has become a morass, as lower courts have struggled mightily to apply the Supreme Court's various judicial glosses on, and exceptions to, patent eligibility. The result has been inconsistency, uncertainty, and disagreement between and among district and appellate judges—and, indeed, conflicts between and within Supreme Court cases themselves. One need look no further than the Federal Circuit's recent case of *CLS Bank International v. Alice Corp. Pty. Ltd.*⁵, in which an "irreconcilably fractured"⁶ *en banc* court failed to articulate any approach to the § 101 analysis that could garner majority support among the judges. As Chief Judge Rader remarked, "though much is published today discussing the proper approach to the patent eligibility inquiry, nothing said today beyond our judgment has the weight of precedent."⁷ In the midst of such a morass, *Myriad's* straightforward analysis is a welcome change.

At the same time, we recognize that the Supreme Court's juridical glosses on, and exceptions to, § 101 have been motivated by legitimate—and, indeed, weighty—policy concerns. These concerns include striking the proper balance between spurring innovation through the grant of a patent monopoly and ensuring that the patent system does not hamper innovation by restricting the exploitation and investigation of matters that properly belong in the public domain. However, in our view, the patent laws provide other tools in addition to § 101 for striking this balance, and in many cases those other tools provide a more logical and predictable analysis. Under the approach to § 101 that we advance in this Article—an approach that takes its cues from *Myriad* and the statute itself—most of the § 101 cases that we survey may well have turned out the same way, albeit by a different legal route.

5. 717 F.3d 1269 (Fed. Cir. 2013) (*en banc*).

6. *Id.* at 1314 (Moore, J., dissenting) (lamenting the fact that the Federal Circuit "is irreconcilably fractured over these system claims [when] there are many similar cases pending before our court and the district courts").

7. *Id.* at 1292 n.1 (Rader, C.J., concurring in part and dissenting in part).

This Article begins with an analysis of § 101, including its constitutional basis and its statutory predecessors. We then survey the history of the Supreme Court's case law on patent eligibility, focusing on the development of the Court's "judicial exceptions" to § 101 and the inconsistencies from case to case in the Court's application of those judicial exceptions. We proceed with a discussion of why, in our view, the Court's patent-eligibility case law has diverged too far from the statutory scope of § 101, and we show how the Court's frameworks have proven to be unmanageable for lower courts to apply. We end by considering how future application and interpretation of *Myriad* may provide a pivotal opportunity for the Court to hit "reset" on its § 101 jurisprudence and to bring much-needed certainty and predictability to this troubled area of the law.

Finally, we note the obvious: the thesis we present here is not intended to be a descriptive summary on the state of the law today. *Myriad* has not, of course, overruled prior Supreme Court cases *sub silentio*. It is up to the Supreme Court alone to decide whether, and to what extent, it will change course in its § 101 jurisprudence. Until then, lower courts and litigators must apply Supreme Court precedent as it currently stands, including the judicial glosses and exceptions that continue in full force under prevailing Supreme Court precedent.

II. PATENT ELIGIBILITY: CONSTITUTIONAL AND STATUTORY BASES

Section 101 of the Patent Act defines the categories of subject matter that are patent eligible. It reads, in its entirety, as follows: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."⁸

On its face, § 101 states that "any" new and useful "process, machine, manufacture, or composition of matter" constitutes patent-eligible subject matter.⁹ However, despite this plain language, the Supreme Court has recognized "three specific exceptions to § 101's broad patent eligibility principles: 'laws of nature, physical phenomena, and abstract ideas'" are not patent eligible.¹⁰

8. 35 U.S.C. § 101 (2006).

9. *Id.*

10. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (emphasis added) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

The task of defining and consistently applying these vague, judicially created “exceptions” to § 101—which are “not required by the statutory text”¹¹—has confounded courts, commentators, and practitioners for more than 150 years. In an attempt to lend a modicum of clarity to more than a century of confusion, Parts II and III walk through and analyze the history of patent-eligible subject matter, starting with the U.S. Constitutional Convention, and ending with the Supreme Court’s June 13, 2013, decision in *Myriad*.¹²

A. Intellectual Property Clause

Article I, Section 8, Clause 8 of the U.S. Constitution, known as the “Intellectual Property Clause,” bestows upon Congress the power: “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”¹³

While a plain reading clearly indicates that the Intellectual Property Clause is expansive in scope, an analysis of the Clause’s origins is instructive. We begin with the Constitutional Convention of 1787, wherein James Madison of Virginia and Charles Pinckney of South Carolina each proposed multiple separate provisions relating to federal power over intellectual property rights.¹⁴ The Convention Journal for August 18, 1787, listed twenty “powers proposed to be vested in the Legislature of the United States,” among which were the following provisions relating to intellectual property:

To secure to literary authors their copy rights for a limited time

.....

To encourage, by proper premiums and provisions, the advancement of useful knowledge and discoveries

.....

To grant patents for useful inventions

To secure to authors exclusive rights for a certain time

11. *Id.*

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

13. U.S. CONST. art. I, § 8, cl. 8.

14. *See* 2 THE RECORDS OF THE FEDERAL CONVENTION OF 1787, at 321–25 (Max Farrand ed., 1937); *see also* S. REP. NO. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2396 (describing the history of the Intellectual Property Clause of the U.S. Constitution when enacting the Patent Act of 1952).

To establish public institutions, rewards and immunities for the promotion of agriculture, commerce, trades, and manufactures.¹⁵

Although the Convention Journal does not state who proposed each of these powers, James Madison's journal entry for August 18, 1787, indicates that Madison offered the first two proposed powers, while Pinckney offered the latter three.¹⁶ On September 5, 1787, the Committee of Eleven—which included Madison—merged the foregoing proposals into a single provision that would become the Intellectual Property Clause: “To promote the progress of science and useful arts by securing for limited times to Authors and Inventors the exclusive right to their respective writings and discoveries.”¹⁷

The Committee unanimously approved the Intellectual Property Clause without recorded debate,¹⁸ and the Clause later became Article I, Section 8, Clause 8 of the U.S. Constitution (with only minor changes in capitalization and punctuation).¹⁹

Describing the Intellectual Property Clause in the Federalist papers, Madison stated that “[t]he utility of this power will scarcely be questioned,” as the “public good fully coincides in both cases [of copyrights and patents] with the claims of individuals.”²⁰ Madison's reference to the “public good” can best be understood as invoking the policy goal of incentivizing innovation, which is reflected in the Intellectual Property Clause's grant of power to “promote the Progress of Science and useful Arts” by securing to authors and inventors “the exclusive Right to their respective Writings and Discoveries.”²¹ This language reflects Madison's broad proposal “[t]o encourage, by proper premiums and provisions, the advancement of useful knowledge and discoveries.”²²

15. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 321–22.

16. *Id.* at 324–25.

17. *Id.* at 505–09.

18. *Id.* at 505–09, 547.

19. See U.S. CONST. art. I, § 8, cl. 8. (“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”).

20. James Madison, THE FEDERALIST NO. 43, at 309 (1788).

21. *Id.*; see also U.S. CONST. art. I, § 8, cl. 8 (same).

22. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 321–22; 324–25.

Indeed, the Intellectual Property Clause reflects many of the broader provisions proposed by Madison and Pinckney, while eschewing many of the narrow ones. For example, Pinckney narrowly proposed to “grant *patents* for useful *inventions*,” while Madison broadly proposed protections for “useful knowledge and *discoveries*.”²³ The Committee of Eleven apparently merged these two proposals into the Intellectual Property Clause, omitting the narrow term “patents” and broadly including *both* the terms “Inventors” and “Discoveries.”²⁴ Further, the phrase “To promote the Progress of Science and useful Arts” in the Intellectual Property Clause reflects Madison’s broad proposal “To encourage . . . the advancement of useful knowledge.”²⁵ As Congress and commentators have noted, in the late eighteenth century, the word “Science” in this context was generally understood to mean “knowledge in general.”²⁶

Similarly, on the copyright front, Madison narrowly proposed to secure “*literary authors* their *copy rights*,” while Pinckney broadly proposed to secure “*authors* [their] *exclusive rights*.”²⁷ The Intellectual Property Clause again incorporates language akin to the broader proposal, authorizing Congress to secure to “Authors . . . the exclusive Right to their . . . Writings.”²⁸ The narrower term “copyrights”—like the terms “patents” and “inventions”—does not appear in the Intellectual Property Clause.²⁹

Finally, Pinckney’s narrowest proposal—“To establish public institutions, rewards and immunities for the promotion of agriculture,

23. *Id.* (compare Pinckney’s first proposal and Madison’s second proposal) (emphasis added).

24. U.S. CONST. art. I, § 8, cl. 8.

25. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 321–22; 324–25 (Madison’s second proposal).

26. S. REP. NO. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2396 (Committee Report accompanying the Patent Act of 1952, commenting on the history of the Intellectual Property Clause); *see also* Giles S. Rich, *The Principles of Patentability*, 42 J. PAT. OFF. SOC’Y 75, 79–80 (1960) (addressing the meaning of “science” in 1787); Arthur H. Seidel, *The Constitution and a Standard of Patentability*, 48 J. PAT. OFF. SOC’Y 5, 11–12 n.14 (1966) (same); Edward C. Walterscheid, *Conforming the General Welfare Clause and the Intellectual Property Clause*, 13 HARV. J.L. & TECH. 87, 93, n.21 (1999) (noting that Samuel Johnson’s *A Dictionary of the English Language*, an authoritative dictionary at the time, lists “knowledge” as the first definition of “science”).

27. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 321, 325 (emphasis added) (compare Madison’s first proposal with Pinckney’s second proposal).

28. U.S. CONST. art. I, § 8, cl. 8.

29. *Id.*

commerce, trades, and manufactures”³⁰—is not reflected in the Intellectual Property Clause in any way.³¹

Overall, the broad language of the Intellectual Property Clause, coupled with the fact that multiple narrower proposals by Madison and Pinckney were considered and rejected, suggests that the Framers intended the Intellectual Property Clause to be expansive in scope.

B. Legislative History of Section 101

Pursuant to the legislative power granted by the Intellectual Property Clause, Congress enacted the first patent statute in 1790.³² Congress titled the law “An Act to promote the progress of useful Arts,” mirroring the language of the Intellectual Property Clause itself.³³ Section 1 of the 1790 Act included the first statutory provision defining the categories of patent-eligible subject matter, stating that a patent may be sought by anyone who has invented or discovered “any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used.”³⁴

Patent applications under the 1790 Act were to be submitted to a Patent Board consisting of the secretary of state, the secretary of war, and the attorney general, which was entitled to grant a patent if it “deem[ed] the invention or discovery sufficiently useful and important.”³⁵ Pursuant to section 2 of the 1790 Act, applicants who were approved for patent grants were thereafter required to file with the secretary of state a “specification in writing, containing a description . . . of the invention or discovery” in sufficient detail “to enable a workman or other person skilled in the art or manufacture . . . to make, construct, or use the same, to the end that the public may have the full benefit thereof, after the expiration of the patent term.”³⁶ During the brief pendency of the 1790 Act, the Secretary of State and leader of the Patent Board was “Thomas

30. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 325 (Pinckney’s third proposal).

31. U.S. CONST. art. I, § 8, cl. 8.

32. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793).

33. *Id.*; see also U.S. CONST. art. I, § 8, cl. 8 (“To promote the Progress of . . . useful Arts . . .”).

34. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793).

35. *Id.*

36. *Id.* ch. 7, § 2. The foregoing provision in section 2 of the 1790 act was clearly the beginning of the modern written description and enablement requirements of 35 U.S.C. § 112.

Jefferson, who was personally deeply interested in the subject matter of patent law.”³⁷

The administrative requirements of the 1790 Act proved too time consuming for the small Patent Board to handle, particularly considering the numerous other demands placed on the offices of the secretary of state, the secretary of war, and the attorney general.³⁸ Accordingly, the 1790 Act was replaced after only three years by the Patent Act of 1793, authored by Thomas Jefferson.³⁹ The 1793 Act created a registration system whereby patents were granted to anyone who fulfilled the formal filing requirements and provided an “oath or affirmation” of the applicant’s belief “that he is the true inventor or discoverer.”⁴⁰ The 1793 Act also modified the categories of patent-eligible subject matter to include “any *new* and useful art, machine, manufacture or *composition of matter*, or any *new* and useful improvement [thereof], not known or used before.”⁴¹

The broad patent-eligibility language in the 1793 Act “embodied Jefferson’s philosophy that ‘ingenuity should receive a liberal encouragement.’”⁴² Moreover, the patent-eligibility provision of the 1793 Act included several notable changes from that of the 1790 Act.

First, the 1793 Act eliminated the “engine” and “device” categories from the definition of patent-eligible subject matter, while simultaneously adding a new category for “composition[s] of matter.”⁴³ This change can best be viewed as broadening the scope of patent-eligible subject matter, as the eliminated “engine” and “device” categories were substantially duplicative of the “machine” category, whereas the broad new “composition of matter” category was not clearly duplicative of any previously included category.

37. S. REP. NO. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2396 (Committee Report accompanying the Patent Act of 1952).

38. *Id.* at 2397.

39. Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793); *see also* *Diamond v. Chakrabarty*, 447 U.S. 303, 308–09 (1980) (referencing Thomas Jefferson as the author of the 1793 Act).

40. Patent Act of 1793, ch. 11, § 3, 1 Stat. 321 (1793); *see also* S. REP. NO. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2397 (Committee Report accompanying the Patent Act of 1952, discussing the history of the 1793 Act).

41. Patent Act of 1793, ch. 11, § 1, 1 Stat. 319 (1793) (emphasis added).

42. *Chakrabarty*, 447 U.S. at 308–09 (quoting 5 WRITINGS OF THOMAS JEFFERSON 75–76 (Washington ed. 1871)).

43. *Compare* Patent Act of 1790, ch. 7, § 2, 1 Stat. 110 (1790) (repealed 1793) (categories of patent-eligible subject matter including “art, manufacture, engine, machine, or device”), *with* Patent Act of 1793, ch. 11, § 1, 1 Stat. 319 (1793) (categories of patent-eligible subject matter including “art, machine, manufacture or composition of matter”).

Second, the 1793 Act added the word “new” to the definition of patent-eligible subject matter—i.e., “any *new* and useful art, machine, manufacture or composition of matter, or any *new* and useful improvement” thereof.⁴⁴ This is notable because, at the time, the foregoing provision already included a statement in the same sentence that the invention or discovery must be “not before known or used” (1790 Act),⁴⁵ or “not known or used before the application” (1793 Act).⁴⁶ This suggests that Congress (and Jefferson) intended the word “new” to have a different meaning in the context of patent-eligible subject matter, unlinked to the concept of novelty then reflected in the “known or used” language.⁴⁷ Otherwise, the addition of the word “new” would have been redundant. We posit that the term “new” was added to the definition of patent-eligible subject matter to convey that something must be “new” *to the world* to be patent eligible, even if it was “not known or used” prior to its discovery. Indeed, as we will discuss in Part V.F and elsewhere throughout this Article, we believe that the word “new” offers perhaps the only concrete statutory support for any part of the Supreme Court’s judicial “exceptions” to § 101.⁴⁸

Another notable feature of the 1793 Act was its express recognition that a patent might sometimes dominate later patents that claim improvements to the originally patented invention, potentially blocking downstream inventors from practicing their patented improvements. Specifically, section 2 of the 1793 Act states:

Provided always, and be it further enacted, That any person, who shall have discovered an improvement in the principle of any machine, or in the process of any composition of matter, which shall have been patented, and shall have obtained a patent for such improvement, he shall not be at liberty to make, use or vend the original discovery, nor shall the first inventor be at liberty to use the improvement.⁴⁹

44. Patent Act of 1793, ch. 11, § 1, 1 Stat. 319 (1793) (emphasis added).

45. Patent Act of 1790, ch. 7, § 1, 1 Stat. 110 (1790) (repealed 1793).

46. Patent Act of 1793, ch. 11, § 1, 1 Stat. 319 (1793).

47. *Id.*; see also 35 U.S.C. § 102 (providing the modern novelty requirement).

48. See *infra* Part III.

49. Patent Act of 1793, ch. 11, § 2, 1 Stat. 318 (1793).

This is significant, as it shows that the patent laws were by design intended to allow inventors to exclude others from practicing their patented inventions, even if doing so might *preempt* later inventors from practicing their own innovations that build upon or make use of the earlier patented invention.⁵⁰

The 1793 Act remained in force until 1836, whereupon it was replaced in response to dissatisfaction with the granting of patents for inventions without any formal examination as to novelty or the other requirements of patentability.⁵¹ The 1836 Act established a Patent Office tasked with examining applications for patentability and given the power to reject applications if required.⁵² Despite this change, the substantive language pertaining to patent-eligible subject matter remained substantially unchanged in the 1836 Act, as well as in subsequent revisions to the statute made in 1870 and 1874.⁵³

In 1952, when Congress re-codified the patent laws, it replaced the word “art” with “process” in the definition of patent-eligible subject matter, creating the modern embodiment of § 101: “Whoever invents or discovers any new and useful *process*, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.”⁵⁴

The Committee Report to the 1952 Act indicates that this minor change was merely intended to clarify—not modify—the scope of patent-eligible subject matter, because the term “art” as used in the statute had always been interpreted to mean “process or method.”⁵⁵

50. *See, e.g.*, *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1365 (Fed. Cir. 2010) (“A ‘blocking patent’ is an earlier patent that must be licensed in order to practice a later patent.”).

51. *See* S. DOC. NO. 338, 24th Cong., 1st Sess. (1836) (report of Senate committee appointed to study the patent system and propose necessary changes, finding that “[a] considerable portion of the patents granted are worthless and void, as conflicting and infringing upon one another, or upon public rights not subject to patent privileges”); *see also* S. REP. NO. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, at 2397 (Committee Report accompanying the Patent Act of 1952, discussing the history of the 1836 Act).

52. Patent Act of 1836, ch. 357, § 1, 5 Stat. 117 (1836).

53. *Id.*; *see also* *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (“Subsequent patent statutes in 1836, 1870, and 1874 employed the same broad language.”).

54. Patent Act of 1952, ch. 950, § 101, 66 Stat. 792 (1952) (codified at 35 U.S.C. § 101) (emphasis added).

55. *See* S. REP. NO. 1979, 82d Cong., 2d Sess. 5, 17 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2398–99 (“‘Art’ in this place in the present statute has a different meaning than the words ‘useful art’ in the Constitution, and a different meaning than the use of the word ‘art’ in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process

Further, section 100(b) of the 1952 Act expressly and broadly defined the term “process,” stating: “The term ‘process’ means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.”⁵⁶ The Committee Report further states that the foregoing broad definition was added specifically to quell any remaining doubts as to the expansive scope of patent-eligible processes.⁵⁷

Another notable change in the 1952 Act was that, for the first time, Congress clearly separated the definition of patent-eligible subject matter from the novelty requirement, codifying these distinct requirements in sections 101 and 102, respectively.⁵⁸ The 1952 Act also included an express non-obviousness requirement for the first time (section 103),⁵⁹ and it included a separate section dedicated to the disclosure requirements (section 112).⁶⁰ Within section 101’s definition of patent-eligible subject matter, the novelty-related language included in prior versions of the statute (e.g., “not known or used”)⁶¹ was deleted and replaced with a statement that the listed categories of subject matter are patentable “subject to the conditions and requirements of this title,”⁶² referring to the additional necessity of satisfying the separate patentability requirements defined in sections 102, 103, and 112. Notably, however, Congress retained the word “new” in section 101’s definition of patent-eligible subject matter despite moving the novelty requirement to section 102, indicating that the word “new” in section 101 must mean something other than mere novelty.⁶³

or method. The word ‘process’ has been used to avoid the necessity of explanation that the word ‘art’ as used in this place means ‘process or method,’ and that it does not mean the same thing as the word ‘art’ in other places.”)

56. Patent Act of 1952, Pub L. No 82-593, § 100(b), 66 Stat. 792 (1952) (codified at 35 U.S.C. § 100(b)).

57. See S. REP. NO. 1979, 82d Cong., 2d Sess. 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399 (“The definition of ‘process’ has been added in section 100 to make it clear that ‘process or method’ is meant, and also to clarify the present law as to the patentability of certain types of processes or methods as to which some insubstantial doubts have been expressed.”).

58. See Patent Act of 1952, Pub L. No 82-593, §§ 100(b) & 101, 66 Stat. 792 (1952) (codified at 35 U.S.C. §§ 100(b) & 101).

59. *Id.* § 103 (codified at 35 U.S.C. § 103).

60. *Id.* § 112 (codified at 35 U.S.C. § 112).

61. See, e.g., Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790); Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793); Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836).

62. Patent Act of 1952, Pub L. No 82-593, § 101, 66 Stat. 792 (1952).

63. See *infra* Part V.F.

Finally, the 1952 Act is notable for the fact that the accompanying Committee Report interpreted the scope of patent-eligible subject matter under section 101 to broadly include “*anything under the sun that is made by man.*”⁶⁴ This statement has been often cited and hotly debated. Some judges and commentators have suggested that the statement has been taken out of context, as it was immediately followed by the statement: “but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.”⁶⁵ We disagree. To the contrary, proponents of the out-of-context argument have themselves taken the relevant statement out of its context, choosing to analyze only the single sentence: “A person may have ‘invented’ a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.”⁶⁶ However, viewing the foregoing statement in its *full* context throws cold water on the out-of-context argument, as the Committee Report to the 1952 Act states:

Section 101 sets forth the subject matter that can be patented, “subject to the conditions and requirements of this title.” The conditions under which a patent may be obtained follow, and section 102 covers the conditions relating to novelty.

A person may have ‘invented’ a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.

64. S. REP. NO. 1979, 82d Cong., 2d Sess. 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399 (emphasis added).

65. *See, e.g.*, *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1303–04 (2012) (emphasizing the language “but it is not necessarily patentable under section 101”); *In re Bilski*, 545 F.3d 943, 1000 (2008) (Mayer, J., dissenting) (“This statement does not support the contention that Congress intended ‘anything under the sun’ to be patentable. To the contrary, the language supports the opposite view: a person may have ‘invented’ anything under the sun, but it is ‘not necessarily patentable’ unless the statutory requirements for patentability have been satisfied. Thus, the legislative history oft-cited to support business method patents undercuts, rather than supports, the notion that Congress intended to extend the scope of section 101 to encompass such methods.”); Robin Feldman, *A Conversation on Judicial Decision-Making*, 5 HASTINGS SCI. & TECH. L.J. 1, 8 (2013).

66. S. REP. NO. 1979, 82d Cong., 2d Sess. 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399.

Section 102 in paragraphs (a), (b), and (c) repeats the conditions in the existing law relating to novelty.⁶⁷

Considered in its full context, we believe that the meaning of the foregoing passage is quite clear: “Section 101 sets forth the subject matter that *can be patented*,” which “may include anything under the sun that is made by man.”⁶⁸ However, even if a particular invention or discovery constitutes patent-eligible subject matter under section 101, it is only patentable “subject to the conditions of and requirements of this title.”⁶⁹ “The conditions under which a patent may be obtained follow [section 101],” in provisions such as “section 102,” which “covers the conditions relating to novelty.”⁷⁰

Accordingly, we posit that the foregoing passage from the Committee Report to the 1952 Act does indeed evidence a congressional intent to broadly define the categories of patent-eligible subject matter listed in section 101—i.e., to “include anything under the sun that is made by man.”⁷¹ The statement that such an invention or discovery will still not be patentable “unless the conditions of the title are fulfilled” merely conveyed the unremarkable proposition that the requirements of sections 102, 103, and 112 must *also* be satisfied in order to obtain a patent.⁷²

III. A HISTORY OF THE “JUDICIAL EXCEPTIONS” TO SECTION 101

The Supreme Court has recognized “three specific exceptions to § 101’s broad patent eligibility principles: ‘*laws of nature, physical phenomena, and abstract ideas*’” are not patent eligible.⁷³ In this part, we analyze relevant Supreme Court cases over the past two centuries in an effort to determine the bases for and scope of these judicial exceptions to patent eligibility.

A. *The Early Cases*

The earliest Supreme Court decision typically cited as relevant to patent-eligible subject matter is the 1852 case of *Le Roy v.*

67. *Id.* (emphasis added).

68. *Id.* (emphasis added).

69. *Id.*

70. *Id.*

71. *Id.*

72. See 35 U.S.C. §§ 102, 103, 112.

73. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (emphasis added) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

Tatham.⁷⁴ The patent at issue in *Le Roy* described and claimed an improved machine for manufacturing metal pipes.⁷⁵ The claimed machine was designed to exploit the patentees' discovery "that lead, when recently become set, and while under heat and extreme pressure in a close vessel, would reunite perfectly, after a separation of its parts," allowing pipes of any length to be crafted without casting in a mold.⁷⁶

The primary issue on appeal in *Le Roy* was the propriety of a jury instruction pertaining to novelty.⁷⁷ The trial court had instructed the jury "that the originality of the invention did not consist in the novelty of the machinery, but in bringing a newly discovered principle into practical application."⁷⁸ However, the Supreme Court construed the patent as claiming a "combination of . . . machinery" for manufacturing pipes, not a *method* of manufacturing pipes.⁷⁹ As such, the Court held that it was error to instruct the jury that "the novelty of the combination of the machinery, specifically claimed by the patentees as their invention, was not a material fact."⁸⁰

It was not disputed in *Le Roy* that the claimed machine for manufacturing pipes constituted patent-eligible subject matter. Moreover, the Court specifically noted that "[t]he question whether the newly developed property of lead, used in the formulation of pipes, might have been patented, if claimed as developed, without the invention of machinery, was not in the case."⁸¹ Nonetheless, for whatever reason, the Court chose to opine at length on the subject. Writing for the Court, Justice McLean offered the following:

It is admitted, that a principle is not patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right. Nor can an exclusive right exist to a new power, should one be discovered in addition to those already known. Through the agency of machinery a new steam power may be said to have been generated. But

74. 55 U.S. 156 (1852).

75. *Id.* at 171.

76. *Id.* at 173.

77. *Id.* at 176–77.

78. *Id.* at 176–77.

79. *Id.* at 176.

80. *Id.* at 177.

81. *Id.*

no one can appropriate this power exclusively to himself, under the patent laws. The same may be said of electricity, and of any other power in nature, which is alike open to all, and may be applied to useful purposes by the use of machinery.

In all such cases, the processes used to extract, modify, and concentrate natural agencies, constitute the invention. The elements of the power exist; the invention is not in discovering them, but in applying them to useful objects.⁸²

The Court did not cite the Patent Act or its legislative history in support of the above sweeping dicta. Rather, the Court offered a pure policy rationale, expressing concern as to the potential preemptive effects broad patents might have on downstream innovation:

A patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever. This, by creating monopolies, would discourage arts and manufacturers, against the avowed policy of the patent laws.⁸³

And thus, with a stroke of the pen—without any statutory interpretation, and in a case that did not raise patent-eligibility concerns—the Court set in motion a snowball that would grow to define more than 160 years of patent-eligibility jurisprudence.

A year later, in the 1853 case of *O'Reilly v. Morse*,⁸⁴ the Supreme Court considered a patent directed to Samuel Morse's famed invention, the electromagnetic telegraph. The Court found that Morse was the first and true inventor of the telegraph,⁸⁵ and it discerned no flaws in the first seven claims of Morse's patent, all of which were directed to the telegraph device and its use.⁸⁶ However, the Court took exception to Claim Eight, which read as follows:

Eighth. I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being *the use of the motive power of the electric or galvanic*

82. *Id.* at 174–75.

83. *Id.* at 175.

84. 56 U.S. (15 How.) 62 (1853).

85. *Id.* at 109.

86. *Id.* at 112.

*current, which I call electro-magnetism, however developed for making or printing intelligible characters, signs, or letters, at any distances, being a new application of that power of which I claim to be the first inventor or discoverer.*⁸⁷

The Court found that Claim Eight's broad scope captured more than Morse was entitled to claim as his invention.⁸⁸ Although Morse invented the telegraph, he had "not discovered, that the electric or galvanic current will always print at a distance, no matter what may be the form of machinery or mechanical contrivances through which it passes."⁸⁹ The Court expressed concern that Claim Eight could capture advancements by future inventors who, "in the onward march of science, may discover a mode of writing or printing at a distance by means of the electric or galvanic current, *without using any part of the process or combination set forth in the plaintiff's specification.*"⁹⁰

The Court found that the disclosure in Morse's specification (describing the telegraph and its use) was not commensurate with the broader scope of Claim Eight (reciting the use of electromagnetism, by any means, to print characters at a distance). Referring to the disclosure requirements set forth in sections 5 and 6 of the Patent Act of 1836,⁹¹ the Court stated:

The act of Congress above recited, requires that the invention shall be so described, that a person skilled in the science to which it appertains, or with which it is most

87. *Id.* (emphasis added).

88. *Id.* at 112–13 ("He claims the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs, or letters at a distance . . . [H]e claims an exclusive right to use a manner and process which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent. The court is of the opinion that the claim is too broad, and not warranted by law.").

89. *Id.* at 117.

90. *Id.* at 113 (emphasis added).

91. *Id.* at 118 (citing Patent Act of 1836, ch. 357, §§ 5 & 6, 5 Stat. 117 (1836)); *see also* Patent Act of 1836 § 5 (requiring a patent to include claims "specifying what the patentee claims as his invention or discovery," while "referring to the specifications for the particulars thereof"); *id.* § 6 (requiring "a written description of [the] invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full, clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same").

nearly connected, shall be able to construct the improvement from the description by the inventor.

Now, in this case, *there is no description but one*, of a process by which signs or letters may be printed at a distance. And yet he claims the exclusive right to *any other mode and any other process, although not described by him*, by which the end can be accomplished, if electro-magnetism is used as the motive power. That is to say—he claims a patent, for an effect produced by the use of electro-magnetism distinct from the process or machinery necessary to produce it. The words of the acts of Congress above quoted show that no patent can lawfully issue upon such a claim. *For he claims what he has not described in the manner required by law.*⁹²

It thus appears that the Supreme Court rested its holding in *Morse* on enablement grounds,⁹³ not on any finding regarding patent-eligible subject matter.⁹⁴ We view *Morse* as an early application of

92. *O'Reilly*, 56 U.S. (15 How.) at 120 (emphasis added).

93. Today, the enablement requirement is set forth in 35 U.S.C. § 112, which states:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same

35 U.S.C. § 112(a) (2012). In reaching its holding in *Morse*, the Court analyzed section 6 of the Patent Act of 1836, which stated the enablement requirement in similar terms to the present-day statute:

But before any inventor shall receive a patent for any such new invention or discovery, he shall deliver a written description of his invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full, clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same

Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836).

94. We join a number of commentators in making the straightforward yet important observation that *Morse* was decided on enablement grounds. *See, e.g.*, CRAIG ALLEN NARD, *THE LAW OF PATENTS* 61–62 (2008) (“The majority in *Morse* held claim eight invalid because the breadth of the claim was not commensurate with the specification. . . . The Court employed the enablement requirement to constrain claim scope, limiting *Morse* to his first seven claims.”); Benjamin Hattenbach, *On Illuminating Black Holes in Patent Disclosures: Toward a Structured Approach to Identifying Omitted Elements Under the Written Description Requirement of Patent Law*, 38 HOUS. L. REV. 1195, 1200 n.21 (2001) (“In evaluating enablement, the question is not whether something within the scope of the claim is enabled, but whether everything is enabled. For example, in the infamous telegraph case, [*Morse*], the Court decided that *Morse*’s specification describing the telegraph might have supported claims to the telegraph, but did not enable claims to all means of using electro-magnetism to communicate at a distance.” (citations omitted)); A. Samuel Oddi, *Regeneration in American Patent Law: Statutory Subject Matter*, 46

the principle that, “[t]o be enabling, the specification of a patent must teach those skilled in the art how to make and use the *full scope* of the claimed invention without ‘undue experimentation.’”⁹⁵ The “full scope” enablement doctrine requires a patent’s disclosure to be “commensurate with the scope of the claims,” thereby preventing “overbroad claiming that might otherwise attempt to cover more than was actually invented.”⁹⁶ In *Morse*, although the patent specification enabled a species of invention (i.e., the telegraph), it failed to enable the full scope of a claim that recited a genus (i.e., the use of electromagnetism, by any means, to print characters at a distance).⁹⁷ As the Court explained, Morse’s disclosure of the telegraph “confers on him the exclusive right to use *the means he specifies* to produce the result or effect he describes, *and nothing more*.”⁹⁸

Despite the fact that *O’Reilly v. Morse* is best viewed as a landmark decision regarding enablement, it would somehow grow to become synonymous with patent-eligibility jurisprudence over the coming 160 years, with the Supreme Court and lower courts citing *Morse* as support for the maxim that a patent claim may not be so broad as to wholly “preempt” the use of a fundamental principle.⁹⁹

IDEA 491, 514 (2006) (“In modern theory, the issue [in *Morse*] would better be categorized as one of enablement rather than undue breadth and certainly not one of patentable subject matter.”); Aaron J. Zakem, *Rethinking Patentable Subject Matter: Are Statutory Categories Useful?*, 30 CARDOZO L. REV. 2983, 2992 (2009) (“The majority’s concern with the broad coverage of Morse’s claim would seem to indicate that its primary concern is enablement . . .”).

95. *MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1381 (Fed. Cir. 2012) (emphasis added) (quoting *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997)); *see also Wyeth & Cordis Corp. v. Abbott Labs*, 720 F.3d 1380, 1384 (Fed. Cir. 2013) (“Claims are not enabled when, at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation.”).

96. *MagSil*, 687 F.3d at 1380–81 (quoting *Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999 (Fed. Cir. 2008)).

97. *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 120 (1853).

98. *Id.* at 119 (emphasis added); *see also id.* at 119–20 (“Indeed, if the eighth claim of the patentee can be maintained, there was no necessity for any specification, further than to say that he had discovered that, by using the motive power of electro-magnetism, he could print intelligible characters at any distance. We presume it will be admitted on all hands, that no patent could have issued on such a specification. Yet this claim can derive no aid from the specification filed. *It is outside of it, and the patentee claims beyond it.*” (emphasis added)).

99. *See, e.g., Bilski v. Kappos*, 130 S. Ct. 3218, 3253 (2010) (citing *Morse*, 56 U.S. (15 How.) at 113) (describing *Morse* as “explaining that Morse’s patent on electromagnetism for writing would preempt a wide swath of technological developments”).

To the contrary, *Morse* actually suggested precisely the opposite—i.e., that one *can* patent a broadly-claimed invention if the scope of the claim is fully enabled. *See Morse*, 56 U.S. (15 How.) at 119 (“Whoever discovers that a certain useful result will be produced, in any art, machine, manufacture, or composition of matter, by the use of certain means, *is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact, that any one*

In the 1874 case of *Rubber-Tip Pencil Co. v. Howard*,¹⁰⁰ the Supreme Court considered a patent directed to “a new and useful rubber head for lead-pencils.”¹⁰¹ The claimed invention comprised a piece of rubber (i.e., an eraser) containing a socket “so made as to fit upon a lead-pencil at or near the end thereof.”¹⁰² In analyzing this patent, the Court began by noting that rubber erasers “had long been known” in the art.¹⁰³ The Court then noted that “[e]verybody knew, when the patent was applied for, that if a solid substance was inserted into a cavity in a piece of rubber smaller than itself, the rubber would cling to it.”¹⁰⁴ The Court then found the patent invalid, offering the following reasoning:

What, therefore, is left for this patentee but the idea that if a pencil is inserted into a cavity in a piece of rubber smaller than itself the rubber will attach itself to the pencil, and when so attached become convenient for use as an eraser?

An idea of itself is not patentable, but a new device by which it may be made practically useful is. The idea of this patentee was a good one, but his device to give it effect, though useful, was not new. Consequently he took nothing by his patent.¹⁰⁵

The Court’s holding in *Rubber-Tip Pencil* was rather ambiguous. The Court’s analysis of the facts—finding that rubber erasers and rubber sockets were well-known in the art—appeared to raise concerns regarding obviousness.¹⁰⁶ Indeed, only a few years later, the Supreme Court repeatedly characterized *Rubber-Tip Pencil* as having been decided on obviousness grounds.¹⁰⁷

skilled in the science to which it pertains, can, by using the means he specifies, without any addition to, or subtraction from them, produce precisely the result he describes.” (emphasis added)).

100. 87 U.S. (20 Wall.) 498 (1874).

101. *Id.* at 505.

102. *Id.* at 502.

103. *Id.* at 505.

104. *Id.* at 507.

105. *Id.* (emphasis added).

106. In 1874, at the time of the *Rubber-Tip Pencil* decision, the Patent Act did not yet include an express non-obviousness requirement. See Patent Act of 1870, ch. 230, 16 Stat. 566, 571–72 (1870).

107. See, e.g., *Wilson Packing Co. v. Chicago Packing & Provision Co.*, 105 U.S. 566, 571 (1881) (citing *Rubber-Tip Pencil* for the proposition that a claimed invention “must involve something more than what is obvious to persons skilled in the art”); *Reckendorfer v. Faber*, 92 U.S. 347, 356–57 (1875) (citing *Rubber-Tip Pencil* for the proposition that the mere application of “mechanical skill” is not “invention”).

However, the rhetoric at the end of *Rubber-Tip Pencil*—i.e., that “[a]n idea of itself is not patentable”—can arguably be read as addressing the issue of patent eligibility.¹⁰⁸ In our view, this vague and unsupported statement thrown out at the end of the opinion was largely divorced from the facts of the case. The patent at issue did not claim an “idea” in the ether; rather, it disclosed and claimed a specific “rubber head for lead-pencils,” which the Court expressly found was a “new article of manufacture” (albeit one that required little ingenuity to create).¹⁰⁹ Indeed, it is difficult to fathom how a specific, new, and useful physical device, which was created by man, can lack patent eligibility. Perhaps it is for this reason that the facts and reasoning of *Rubber-Tip Pencil* have largely been swept into the dustbin of history. However, the broad statement that “[a]n idea of itself is not patentable” has lived on, resurrected by the Supreme Court a century later as support for the maxim that “abstract ideas” are not patent eligible.¹¹⁰

In 1876, in *Cochrane v. Deener*,¹¹¹ the Supreme Court expressly opined on the patent eligibility of a “process [of] manufacturing flour.”¹¹² The claimed process included several steps of using cloth filters to remove impurities from flour while blasting it with air, leaving behind only “superfine” flour.¹¹³ The patent claims at issue were “not limited to any special arrangement of machinery,” but rather recited only the steps needed to perform the process.¹¹⁴ In a cursory analysis without citations, the Court waived off any concerns as to patent eligibility, holding that “the process may be patentable, irrespective of the particular form of the instrumentalities used.”¹¹⁵ The Court reasoned that a process “is just as patentable as is a piece of machinery,” because “[i]n the language of the patent law, [a process] is an art”¹¹⁶—presumably referring to the subject-matter

108. *Rubber-Tip Pencil*, 87 U.S. (20 Wall.) at 507.

109. *Id.* at 505.

110. *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 185 (1981) (“An idea of itself is not patentable.” (quoting *Rubber-Tip Pencil*, 87 U.S. (20 Wall.) at 507)); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (noting “the longstanding rule that ‘[a]n idea of itself is not patentable.’” (quoting *Rubber-Tip Pencil*, 87 U.S. (20 Wall.) at 507)).

111. 94 U.S. 780 (1876).

112. *Id.* at 784.

113. *Id.* at 785.

114. *Id.*

115. *Id.* at 787.

116. *Id.* at 788.

categories of “art” and “machine” listed in the Patent Act of 1870.¹¹⁷ Then, for whatever reason, the Court decided to go further, casually endeavoring to define the term “process” in the following dictum: “A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.”¹¹⁸ This seemingly innocuous statement—made in dicta, and without explanation or citation to authority—was the genesis of what would later become the “machine-or-transformation test,” discussed *infra*.¹¹⁹

The Supreme Court’s next important patent-eligibility decision came in 1881 with the case of *Tilghman v. Proctor*.¹²⁰ Tilghman had discovered that fat can be separated into its component parts (fat acids and glycerine) through “the single and simple process of subjecting the neutral fat, whilst in intimate mixture with water, to a high degree of heat under sufficient pressure to prevent the water from being converted into steam.”¹²¹ Tilghman’s patent recited a single claim directed to the foregoing process, irrespective of the form of machinery used to carry it out.¹²² The Court held that this claim was directed to patent-eligible subject matter, stating:

That a patent can be granted for a process, there can be no doubt. The patent law is not confined to new machines and new compositions of matter, but extends to any new and useful art or manufacture. A manufacturing process is clearly an art, within the meaning of the law.¹²³

Had the Court stopped there, *Tilghman* would have been a fairly unremarkable case. However, the Court instead went on to distinguish *O’Reilly v. Morse*—the enablement case decided 28 years prior—by interpreting the holding of *Morse* in a broad (and we believe incorrect) manner:

117. See Patent Act of 1870, ch. 230, § 24, 16 Stat. 198, 201 (1870) (“Sec. 24. And be it further enacted, That any person who has invented or discovered any new and useful *art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, . . .* may . . . obtain a patent therefor.” (emphasis altered)).

118. *Cochrane*, 94 U.S. at 788.

119. *Bilski v. Kappos*, 130 S. Ct. 3218, 3221 (2010).

120. *Tilghman v. Proctor*, 102 U.S. 707 (1880).

121. *Id.* at 712.

122. *Id.* at 709–10, 715.

123. *Id.* at 722.

The eighth claim of Morse's patent was held to be invalid, *because it was regarded by the court as being not for a process, but for a mere principle*. It amounted to this, namely, a claim of the exclusive right to the use of electro-magnetism as a motive power for making intelligible marks at a distance; *that is, a claim to the exclusive use of one of the powers of nature for a particular purpose*.¹²⁴

In contrast, the Court explained, Tilghman claimed a "*process* of 'manufacturing fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure.'"¹²⁵ This was a claim for a patent-eligible "process" and "not for a mere principle," the Court reasoned, because it "does not claim every mode of accomplishing [the] result" of separating fat into its component parts.¹²⁶

The foregoing holding was a key turning point in the history of patent-eligibility jurisprudence. We view the core error of *Tilghman* to be the Court's interpretation of *Morse* as having invalidated a claim due to the *type* of subject matter claimed, as opposed to invalidating a claim because its breadth was unsupported by a sufficiently enabling disclosure.¹²⁷ This led the *Tilghman* Court to draw a vague and unsteady distinction between claiming an unpatentable "principle" and claiming a patent-eligible "process."¹²⁸

To be sure, the *Tilghman* Court could have instead distinguished *Morse* on enablement grounds. The Court analyzed the specification of Tilghman's patent at length and concluded that it provided a sufficiently enabling disclosure to support Tilghman's process claim.¹²⁹ Although the process claim was not limited to the use of any particular machinery, the Court found that the particular apparatus used "was not material" to the disclosed invention, as the specification disclosed that the process could be implemented using means of heating water under pressure that were already well known in the art.¹³⁰ This is in stark contrast to *Morse*, where the patent

124. *Id.* at 726 (emphasis added) (citing *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 62 (1853)).

125. *Id.* at 721.

126. *Id.* at 729.

127. *See supra* notes 93–98 and accompanying text.

128. *Tilghman*, 102 U.S. at 721, 726–27, 729.

129. *Id.* at 718–722.

130. *Id.* at 718 ("The specification then goes on to describe, by the aid of the drawing referred to, the particular device mentioned. But it is evident, and indeed is expressly announced, that the

disclosed a new apparatus (the electromagnetic telegraph), yet attempted to claim any means of using electromagnetism to print characters at a distance.¹³¹ Morse had “not discovered, that the electric or galvanic current will *always* print [characters] at a distance.”¹³² Tilghman, on the other hand, *had* discovered—and disclosed in his patent—that fat will *always* separate into its component parts when one “subject[s] the neutral fat, whilst in intimate mixture with water, to a high degree of heat under sufficient pressure to prevent the water from being converted into steam.”¹³³ Thus, unlike the claim at issue in *Morse*, the “full scope” of Tilghman’s process claim was enabled by the patent’s specification.¹³⁴ Nonetheless, rather than focusing on these core differences in disclosure and claim scope, the *Tilghman* Court chose to distinguish *Morse* by attributing to that case a sweeping, vaguely defined, *per se* patent-eligibility exclusion of any claim directed to a “mere principle.”¹³⁵

The Supreme Court appeared to back away from the foregoing interpretation of *Morse* only a few years later. In 1888, the Court decided *Dolbear v. American Bell Telephone Co.*,¹³⁶ which concerned a patent relating to Alexander Graham Bell’s invention of the telephone. Bell was the first to discover that voices or other sounds could be transmitted over wires by “creating changes of intensity in a continuous current of electricity, exactly corresponding to the changes of density in the air caused by the vibrations which accompany vocal or other sounds.”¹³⁷ The Court characterized this as

process claimed does not have reference to this particular device, for the apparatus described was well known, being similar to that used for producing the hot-blast and for heating water for the purpose of warming houses.”); *id.* at 722 (“The apparatus for performing the process was not patented, and was not material.”); *id.* (“One may discover a new and useful improvement in [a] process . . . , irrespective of any particular form of machinery or mechanical device.”); *id.* at 729 (“The mixing of certain substances together, or the heating of a substance to a certain temperature, is a process. If the mode of doing [the claimed process], or the apparatus in or by which it may be done, is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough, in the patent, to point out the process to be performed, without giving supererogatory directions as to the apparatus or method to be employed.”).

131. *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 112 (1853).

132. *Id.* at 117 (emphasis added).

133. *Tilghman*, 102 U.S. at 712.

134. *See supra* notes 95–98 and accompanying text.

135. *Tilghman*, 102 U.S. at 726–27.

136. 126 U.S. 1 (1888).

137. *Id.* at 533–34.

a “discovery [which] astonished the scientific world.”¹³⁸ Claim Five of Bell’s patent recited his invention as follows: “The method of and apparatus for transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of air accompanying the said vocal or other sounds, substantially as set forth.”¹³⁹

At first glance, Claim Five of Bell’s patent may appear to bear similarities to invalidated Claim Eight of Morse’s patent, which recited “the use of . . . electro-magnetism, however developed for marking or printing intelligible characters . . . at any distances.”¹⁴⁰ The Court, however, expressly distinguished *Morse*, stating that Claim Eight of Morse’s patent had been found invalid because it recited “the use of [electro]magnetism as a motive power, *without regard to the particular process with which it was connected in the patent.*”¹⁴¹ The Court viewed Bell’s claim differently, as it stated:

In the present case the claim is not for the use of a current of electricity in its natural state as it comes from the battery, but for *putting a continuous current, in a closed circuit, into a certain specified condition*, suited to the transmission of vocal and other sounds, and using it in that condition for that purpose. . . . We see nothing in Morse’s case to defeat Bell’s claim; on the contrary, it is in all respects sustained by that authority. It may be that electricity cannot be used at all for the transmission of speech, except in the way Bell has discovered, and that therefore, practically, his patent gives him its exclusive use for that purpose; *but that does not make his claim one for the use of electricity distinct from the particular process with which it is connected in his patent.* It will, if true, show more clearly the great importance of his discovery, but it will not invalidate his patent.¹⁴²

The foregoing statements indicate that the *Dolbear* Court was focused on comparing the claim’s scope to the scope of the patent’s disclosure—i.e., “the particular process with which [the claim] is

138. *Id.* at 539.

139. *Id.* at 531.

140. *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 112 (1853).

141. *Dolbear*, 126 U.S. at 534 (emphasis added).

142. *Id.* at 534–55 (emphasis added).

connected in [the] patent.”¹⁴³ Claim Eight of Morse’s patent was invalid because it improperly attempted to claim *all* processes that use electromagnetism to print characters at a distance, including even processes *not disclosed in the patent*.¹⁴⁴ In contrast, Claim Five of Bell’s patent was valid because it claimed the use of electricity to transmit voices only according to the particular process disclosed in the patent—i.e., “causing electrical undulations, similar in form to the vibrations of air accompanying the said vocal or other sounds.”¹⁴⁵

Notably absent from the *Dolbear* Court’s analysis, however, was any mention of *Morse* standing for the proposition that claims directed to “mere principles” are *per se* excluded from patent eligibility.¹⁴⁶ Indeed, such an approach might have invalidated Bell’s patent, as Claim Five could have easily been characterized as reciting the mere principle of using electricity, varied in intensity according to sound vibrations, to transmit sounds at a distance.

The Supreme Court’s next important decision with implications for patent eligibility came over 50 years later, in the 1939 case of *Mackay Radio & Telegraph Co. v. Radio Corp. of America*.¹⁴⁷ The patent at issue was directed to an antenna configuration for the directional transmission of radio waves.¹⁴⁸ At the time of the invention, it had been well-known in the art that a mathematical equation (Abraham’s formula) could predict the angle of radio transmission off of a single charged wire, calculated as a function of wire length and radio frequency.¹⁴⁹ The patentee designed an antenna comprising multiple wires in a “V” configuration, with the angle of the V chosen according to Abraham’s formula to ensure that all of the wires transmit along the axis intersecting the V’s apex.¹⁵⁰ The Court quickly dismissed any patent-eligibility concerns regarding the claimed antenna, but in doing so, the Court stated the following:

While 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 [the]

143. *Id.*

144. *Id.* at 534.

145. *Id.* at 531, 535.

146. *Contra* *Tilghman v. Proctor*, 102 U.S. 707, 726–27 (1880).

147. 306 U.S. 86 (1939).

148. *Id.* at 88–90.

149. *Id.* at 93–94.

150. *Id.* at 90, 93–94.

scientific truth may be. . . . We assume, without deciding the point, that [the claimed] advance was invention even though it was achieved by the logical application of a known scientific law to a familiar type of antenna.¹⁵¹

This statement—made in dicta and without analysis or citation to authority—would later come to be repeatedly cited by the Supreme Court as support for the vague proposition that “laws of nature,” “abstract ideas,” and “mathematical algorithms” are not patent eligible, whereas *applications* of such principles may be.¹⁵²

With the foregoing decisions—from *Le Roy* in 1852 to *Mackay Radio* in 1939—the Supreme Court had amassed a body of shaky judicial proclamations that would in time snowball to become the judicial “exceptions” that govern patent eligibility today.¹⁵³ We note two important observations regarding the foregoing body of case law.

First, by as late as 1939, the Court had conducted very little statutory interpretation or analysis relevant to the patent-eligibility inquiry. The Court rarely even cited to the language of the Patent Act regarding patent eligibility, much less delved into the Act’s legislative history.

Second, in each of the key decisions above, the Court did not clearly find any patent claim *invalid on patent-eligibility grounds*.¹⁵⁴

151. *Id.* at 94 (emphasis added).

152. *See, e.g.*, *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012) (citing *Mackay Radio*, 306 U.S. at 94); *Diamond v. Diehr*, 450 U.S. 175, 188 (1981) (same); *Parker v. Flook*, 437 U.S. 584, 591–92 (1978) (same); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (same); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (same).

153. *See, e.g.*, *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (“The Court’s precedents provide three specific exceptions to § 101’s broad patent eligibility principles: ‘laws of nature, physical phenomena, and abstract ideas.’” (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980))).

154. One outlier was the case of *American Fruit Growers v. Brogdex Co.*, 283 U.S. 1 (1931), in which the Court invalidated a product claim directed to a “[f]resh citrus fruit of which the rind or skin carries borax in [an] amount that is very small but sufficient to render the fruit resistant to blue mold decay.” *Id.* at 6. The Court narrowly held that an orange treated with borax was not a “manufacture” within the meaning of the Patent Act, because the “[a]ddition of borax to the rind of natural fruit does not produce from the raw material an article for use which possesses a new or distinctive form, quality, or property.” *Id.* at 11. “There is no change in the name, appearance, or general character of the fruit,” the Court reasoned, adding that “[i]t remains a fresh orange, fit only for the same beneficial uses as theretofore.” *Id.* at 12. The Court offered no explanation for why such factors were relevant to patent eligibility. Further, the Court’s holding was factually flawed, as the Court itself recognized that the orange treated with borax *did* have a new quality and beneficial use—namely, increased mold resistance and a resulting longer shelf life. *See id.* at 8, 11–12. Perhaps for these reasons, *American Fruit Growers* is generally viewed today as an

In the cases of *Le Roy*, *Cochrane*, *Tilghman*, *Dolbear*, and *Mackay Radio*, the Court found the claimed inventions patentable, while offering unsupported and vague dicta that could be construed as narrowing patent eligibility.¹⁵⁵ The Court found the claims in *Morse* and *Rubber-Tip Pencil* invalid, but these holdings arguably rested on enablement and obviousness grounds, respectively.¹⁵⁶

Thus, as of 1939, the jurisprudence of patent eligibility was rife with unclear rhetoric, yet almost entirely devoid of substance.

B. The Competing Biotechs: Funk Bros. and Chakrabarty

We view the modern era of jurisprudence—and confusion—regarding patent-eligible subject matter as beginning in 1948 with the case of *Funk Bros. Seed Co. v. Kalo Inoculant Co.*¹⁵⁷

At the time the patent in *Funk Bros.* was filed, it was well-known in the art that root-nodule bacteria (*Rhizobium*) could be used to inoculate the seeds of leguminous plants, creating a symbiotic relationship that assists the resulting plants in gathering nitrogen from the air.¹⁵⁸ Multiple strains of root-nodule bacteria existed, but no individual strain could inoculate all species of legumes.¹⁵⁹ Further, it was believed that the different strains of bacteria could not be combined in a mixture, as they would mutually inhibit each other's effects.¹⁶⁰ Farmers were thus often required to buy multiple packages of inoculants containing different strains of bacteria for use with their different crops.¹⁶¹

However, the patentee in *Funk Bros.* discovered that certain strains of root-nodule bacteria would not mutually inhibit each other and could be used together in mixed cultures, thus allowing a single

outlier with little or no precedential value, as its holding and reasoning have not been relied upon by the Supreme Court in any subsequent case, and it has generally been distinguished by lower courts. See, e.g., DONALD S. CHISUM, 1 CHISUM ON PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 1.02[3][a] (2013) (“[T]he *American Fruit Growers* treatment of the meaning of ‘manufacture’ is of little or no precedential value. . . . Lower court and administrative decisions since *American Fruit Growers* distinguish its holding.”).

155. See *supra* notes 74–83, 112–152 and accompanying text.

156. See *supra* notes 84–110 and accompanying text.

157. 333 U.S. 127 (1948).

158. *Id.* at 128–29.

159. *Id.* at 129.

160. *Id.* at 129–30.

161. *Id.* at 131.

mixture to inoculate many different plant species.¹⁶² The resulting patent recited a series of claims directed to the new mixture of non-inhibitive bacteria, including Claim Four, which read as follows:

An inoculant for leguminous plants comprising a plurality of selected mutually non-inhibitive strains of different species of bacteria of the genus *Rhizobium*, said strains being unaffected by each other in respect to their ability to fix nitrogen in the leguminous plant for which they are specific.¹⁶³

The Supreme Court held that the patentee's claims were invalid for failing to recite patent-eligible subject matter.¹⁶⁴ The Court began by expressly announcing that "phenomena of nature" and "laws of nature" are *per se* excluded from patent eligibility:

[P]atents cannot issue for the discovery of phenomena of nature. The [non-inhibitive] qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes.¹⁶⁵

In support of this sweeping decree, the Court merely cited—without any explanation or analysis—the dicta from its prior cases such as *Le Roy*, *Dolbear*, and *Mackay Radio*.¹⁶⁶ The Court did not address the relevant language of the Patent Act or the Act's legislative history.¹⁶⁷

In applying the announced *per se* exclusion to the claims at issue, the *Funk Bros.* Court appeared to follow a two-step analysis. First, the Court identified what it viewed as the "phenomena of nature" or "law of nature" underlying the patent claims at issue. For this, the Court pointed to the discovery "that certain strains of each species of these bacteria can be mixed without harmful effect to the properties of either"—i.e., "their qualities of non-inhibition."¹⁶⁸ The Court held that the patentee's observation of these effects was "no

162. *Id.* at 130.

163. *Id.* at 128 n.1.

164. *Id.* at 132.

165. *Id.* at 130 (citations omitted).

166. *Id.*

167. *See id.* at 128–32.

168. *Id.* at 131.

more than the discovery of some of the handiwork of nature and hence [was] not patentable.”¹⁶⁹

Second, the Court proceeded to consider whether the claims at issue recited some “invention” beyond the natural principle itself.¹⁷⁰ The Court acknowledged that the claimed “aggregation of select strains of [bacteria] into one product is *an application* of [the] newly-discovered natural principle.”¹⁷¹ However, the Court found that this application “fell short of invention.”¹⁷² No matter “how[] ingenious the discovery of that natural principle,” the Court reasoned that, “once nature’s secret of the non-inhibitive quality of certain strains of the [bacteria] was discovered, the state of the art made the production of a mixed inoculant a simple step.”¹⁷³ In other words, the Court apparently treated the natural principle as if it had been well-known, then found that the claimed application was too “simple” to be considered an “invention” in view of the known natural principle.¹⁷⁴ As we discuss at length throughout this Article, the foregoing two-step analysis applied in *Funk Bros.* was the genesis of what later became the “inventive concept” test for patent eligibility.¹⁷⁵

In holding that the claimed mixture of bacteria did not include an inventive concept, the Court emphasized that each individual strain of bacteria in the mixture was unchanged from its natural state:

Each of the species of root-nodule bacteria contained in the package infects the same group of leguminous plants which it always infected. No species acquires a different use. The combination of species produces no new bacteria, no change in the six species of bacteria, and no enlargement of the range of their utility. Each species has the same effect it always had. The bacteria perform in their natural way. Their combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.¹⁷⁶

169. *Id.*

170. *Id.*

171. *Id.* (emphasis added).

172. *Id.*

173. *Id.* at 132.

174. *Id.*

175. See *infra* Parts III.D–G.

176. *Funk Bros.*, 333 U.S. at 131.

It is unclear why the Court chose to focus on individual components (i.e., each strain of bacteria) as opposed to the claimed invention as a whole (i.e., the *mixture* of multiple non-inhibitive bacteria strains). Indeed, the Court itself acknowledged that the claimed mixture was “new and useful,” as it allowed a farmer to “buy one package and use it for any or all of his crops of leguminous plants.”¹⁷⁷

Concurring in the *Funk Bros.* judgment, Justice Frankfurter raised concerns regarding the workability of the majority’s approach to the patent-eligibility inquiry. With respect to the new *per se* exclusion from patent eligibility, Justice Frankfurter stated the following:

It only confuses the issue, however, to introduce such terms as “the work of nature” and the “laws of nature.” For these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed “the work of nature,” and any patentable composite exemplifies in its properties “the laws of nature.” Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent.¹⁷⁸

Justice Frankfurter further took issue with the majority’s application of its own framework, stating:

Nor can it be contended that there was no invention because the composite has no new properties other than its ingredients in isolation. [The patentee’s] mixture does in fact have the new property of multi-service applicability. Multi-purpose tools, multivalent vaccines, vitamin complex composites, are examples of complexes whose sole new property is the conjunction of the properties of their components. Surely the Court does not mean unwittingly to pass on the patentability of such products by formulating criteria by which future issues of patentability may be prejudged.¹⁷⁹

Justice Frankfurter would have instead found the patentee’s claims invalid under an apparent “full scope” enablement theory,¹⁸⁰ because

177. *Id.*

178. *Id.* at 134–35 (Frankfurter, J., concurring).

179. *Id.* at 135.

180. *See supra* notes 95–98 and accompanying text.

while the patent disclosed only that certain specific strains of bacteria were non-inhibiting, it attempted to broadly claim *all* mixtures containing *any* strains of bacteria that were non-inhibiting.¹⁸¹

About thirty-two years after *Funk Bros.*, in the 1980 case of *Diamond v. Chakrabarty*,¹⁸² the Supreme Court once again addressed the patent eligibility of a claimed invention relating to bacteria. The patent at issue claimed a genetically engineered bacterium capable of breaking down crude oil.¹⁸³ Unlike in *Funk Bros.*, the *Chakrabarty* Court expressly analyzed the language of the Patent Act pertaining to patent eligibility, codified in section 35 U.S.C. § 101.¹⁸⁴

The Court began by “caution[ing] that courts ‘should not read into the patent laws limitations and conditions which the legislature has not expressed.’”¹⁸⁵ Addressing the statutory categories of patent-eligible subject matter (i.e., “any new and useful process, machine, manufacture, or composition of matter”),¹⁸⁶ the Court reasoned that, “[i]n choosing such expansive terms as ‘manufacture’ and ‘composition of matter,’ modified by the comprehensive ‘any,’ Congress plainly contemplated that the patent laws would be given wide scope.”¹⁸⁷ The Court further noted that the term “‘composition of matter’ has been construed consistent with its common usage to include ‘all compositions of two or more substances and . . . all composite articles, whether they be the results of chemical union, or

181. *Id.* at 133–34 (1948) (Frankfurter, J., concurring) (“[The patentee] makes no claim that Funk Brothers used the same combination of strains that he had found mutually compatible. He appears to claim that since he was the originator of the idea that there might be mutually compatible strains and had practically demonstrated that some such strains exist, everyone else is forbidden to use a combination of strains whether they are or are not identical with the combinations that [the patentee] selected and packaged together. . . . The consequences of such a conclusion call for its rejection. Its acceptance would require, for instance in the field of alloys, that if one discovered a particular mixture of metals, which when alloyed had some particular desirable properties, he could patent not merely this particular mixture but the idea of alloying metals for this purpose, and thus exclude everyone else from contriving some other combination of metals which, when alloyed, had the same desirable properties.”).

182. 447 U.S. 303 (1980).

183. *Id.* at 305.

184. *Id.* at 307 (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” (quoting 35 U.S.C. § 101)).

185. *Id.* at 308 (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199 (1933)).

186. 35 U.S.C. § 101 (1976).

187. *Chakrabarty*, 447 U.S. at 308 (quoting *Dubilier*, 289 U.S. at 199).

of mechanical mixture, or whether they be gases, fluids, powders or solids.”¹⁸⁸

Turning to the legislative history of the Patent Act of 1952, the Court stated that “the Committee Reports accompanying the 1952 Act inform us that Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’”¹⁸⁹ The Court viewed this as reflecting “Jefferson’s philosophy that ‘ingenuity should receive a liberal encouragement.’”¹⁹⁰

Referring to prior cases, the *Chakrabarty* Court acknowledged the existence of certain *per se* patent-eligibility exclusions:

This is not to suggest that § 101 has no limits or that it embraces every discovery. *The laws of nature, physical phenomena, and abstract ideas have been held not patentable.* Thus, a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter. Likewise, Einstein could not patent his celebrated law that $E=mc^2$; nor could Newton have patented the law of gravity. Such discoveries are “manifestations of . . . nature, free to all men and reserved exclusively to none.”¹⁹¹

However, the patentee’s genetically engineered bacterium was patent eligible, the Court held, because “[h]is claim is not to a hitherto unknown natural phenomenon, but to a nonnaturally occurring manufacture or composition of matter—a product of human ingenuity ‘having a distinctive name, character [and] use.’”¹⁹² The Court distinguished *Funk Bros.* on the basis that, while the patent in *Funk Bros.* recited a mixture of naturally occurring bacteria, the patentee in *Chakrabarty* had “produced a *new* bacterium with *markedly different characteristics* from any found in nature.”¹⁹³

188. *Id.* (quoting *Shell Development Co. v. Watson*, 149 F. Supp. 729, 280 (D.C. 1957)).

189. *Id.* at 309 (emphasis added) (quoting S. REP. NO. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess., 6 (1952)). The Court also noted that the same language was employed by P.J. Federico, a principal draftsman of the 1952 recodification, in his testimony regarding that legislation: “[U]nder section 101 a person may have invented a machine or a manufacture, which may include anything under the sun that is made by man. . . .” *Id.* at 309 n.6 (quoting Hearings on H.R. 3760 before Subcommittee No. 3 of the House Committee on the Judiciary, 82d Cong., 1st Sess., 37 (1951)).

190. *Id.* at 308–09 (quoting 5 WRITINGS OF THOMAS JEFFERSON 75–76 (Washington ed. 1871)).

191. *Id.* at 309 (emphasis added) (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (internal citations omitted)).

192. *Id.* at 309–10 (quoting *Hartranft v. Wiegmann*, 121 U.S. 609, 615 (1887)).

193. *Id.* at 310 (emphasis added).

C. Benson's Nutshell

Beginning in the 1970s, the Supreme Court decided three landmark cases concerning the patent eligibility of “process” claims directed to the use of mathematical formulas or algorithms. These cases raised issues pertaining to the Court’s *per se* exclusion of “abstract ideas” from patent eligibility.

In 1972, in *Gottschalk v. Benson*,¹⁹⁴ the Supreme Court considered a patent directed to a method of converting binary-coded decimal (BCD) numbers into pure binary using a general purpose computer.¹⁹⁵ The Court described the method as an “algorithm” that was “not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use.”¹⁹⁶ The question presented, the Court said, was “whether the method described and claimed is a ‘process’ within the meaning of the Patent Act.”¹⁹⁷

However, the *Benson* Court’s brief reference to the Patent Act and the “process” category of patent-eligible subject matter was apparently mere lip service. Without making any attempt to engage in statutory interpretation or to analyze the Act’s legislative history, the Court immediately looked to the dicta and unsupported statements of the Court’s own precedents, stating as follows:

The Court stated in [*Mackay Radio*] that “[w]hile a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.” That statement followed the longstanding rule that “[a]n idea of itself is not patentable.” [*Rubber-Tip Pencil*]. “A principle in the abstract, is a fundamental truth; an original cause; a

194. 409 U.S. 63 (1972).

195. *Id.* at 64–66.

The decimal system uses the digits 0-9 arranged in placeholder positions representing powers of ten. For example, the number 13 in decimal format represents $10 (1 \cdot 10^1) + 3 (3 \cdot 10^0)$.

A pure binary system uses only the digits 0 and 1, arranged in placeholder positions representing powers of two. Thus, the decimal number 13 in pure binary is represented as 1101, conceptualized as $8 (1 \cdot 2^3) + 4 (1 \cdot 2^2) + 0 (0 \cdot 2^1) + 1 (1 \cdot 2^0)$.

A binary-coded decimal (BCD) system is the same as pure binary, except that each digit of a decimal number is *individually* represented by its four-digit binary form. Thus, the number 13 in BCD form is represented as 0001 0011.

The patent at issue in *Benson* was directed to an algorithm for converting BCD numbers into pure binary. Thus, for the number 13, it would convert 0001 0011 (BCD) into 1101 (pure binary).

196. *Id.* at 64–65.

197. *Id.* at 64 (citing and quoting 35 U.S.C. §§ 100(b) and 101 (1970)).

motive; these cannot be patented, as no one can claim in either of them an exclusive right.” [*Le Roy*]. Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work. As we stated in [*Funk Bros.*], “He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.”¹⁹⁸

The *Benson* Court then analogized the claimed method of BCD-to-binary conversion to the overbreadth of Claim Eight in *Morse*,¹⁹⁹ stating that “the ‘process’ claim is so abstract and sweeping as to cover *both known and unknown uses* of the BCD to pure binary conversion.”²⁰⁰ The Court further reasoned that, because “[t]he mathematical formula involved here has no substantial practical application except in connection with a digital computer, . . . the patent would *wholly preempt the mathematical formula* and in practical effect would be a patent on the algorithm itself.”²⁰¹ Accordingly, the Court found that the claimed method of BCD-to-binary conversion failed to recite patent-eligible subject matter.²⁰²

In the end, *Benson* offered little more than the “nutshell” that claims directed to “algorithm[s]” are not patent eligible:

What we come down to in a nutshell is the following. It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting BCD numerals to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the

198. *Id.* at 67 (citing and quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852)).

199. *Id.* at 68–69 (citing and quoting *O’Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853)); *see also supra* notes 84–99 and accompanying text.

200. *Id.* at 68 (emphasis added).

201. *Id.* at 71–72 (emphasis added).

202. *Id.* at 72–73.

mathematical formula and in practical effect would be a patent on the algorithm itself.²⁰³

As Judge Rich aptly stated in his concurring opinion in *Application of Christensen*,²⁰⁴ “[t]he Supreme Court in *Benson* appears to have held that claims drafted in such terms [to cover an ‘algorithm’] are not patentable—for what reason remaining a mystery.”²⁰⁵

As a side note, the *Benson* Court at one point repeated the dictum of *Cochrane v. Deener* regarding the definition of a “process,” stating, “Transformation and reduction of an article ‘to a different state or thing’ is the clue to patentability of a process claim that does not include particular machines.”²⁰⁶ However, the Court then clarified this language:

It is argued that a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a ‘different state or thing.’ *We do not hold that no process patent could ever qualify if it did not meet the requirements of our precedents.*²⁰⁷

D. The “Inventive Concept” Conundrum: Flook and Diehr

The Supreme Court’s next major foray into patent-eligible subject matter came in 1978, in *Parker v. Flook*.²⁰⁸ Unlike the claims in *Benson* (at least as the Supreme Court interpreted them), the claims in *Flook* did not attempt to claim an algorithm itself. Rather, they claimed a specific industrial process that included the use of a novel²⁰⁹ algorithm in one of its steps.²¹⁰ In fact, the Court noted that Flook’s claims did *not* “cover every conceivable application” of the applicant’s algorithm.²¹¹

Specifically, Flook claimed a method of updating “alarm limits” (i.e., numeric warning thresholds) used to signal the presence of abnormal conditions during a catalytic conversion process.²¹² The

203. *Id.* at 71–72 (1972).

204. 478 F. 2d 1392 (C.C.P.A. 1973)

205. *Id.* at 1396.

206. *Benson*, 409 U.S. at 70 (quoting *Cochrane v. Deener*, 94 U.S. 780, 788 (1876)).

207. *Id.* at 71 (emphasis added).

208. 437 U.S. 584 (1978).

209. The Court noted that, “[f]or the purpose of our analysis, we assume that respondent’s formula is novel and useful and that he discovered it.” *Id.* at 588.

210. *Flook*, 437 U.S. at 596–97 (appendix to opinion of the Court).

211. *Id.* at 586.

212. *Id.* at 585.

claimed method generally comprised three steps: (1) measuring the present value of a process variable (e.g., temperature) during a catalytic conversion process; (2) calculating an updated alarm limit using both the process variable and a mathematical algorithm; and (3) adjusting the alarm limit to reflect the updated value.²¹³ Noting that the “only novel feature” of the claimed method was the mathematical formula, the Court framed the issue as “whether the discovery of this feature makes an otherwise conventional method eligible for patent protection.”²¹⁴

The Court began its analysis by noting that “[t]his case turns entirely on the proper construction of § 101 of the Patent Act, which describes the subject matter that is eligible for patent protection.”²¹⁵ However, after merely quoting the statute, the Court immediately concluded that “[t]he plain language of § 101 does not answer the question.”²¹⁶ The Court acknowledged that the claimed method was “a ‘process’ in the ordinary sense of the word,” but it found that such a “literal reading” of the Patent Act was incorrect.²¹⁷

The *Flook* Court reached this conclusion without any discussion of legislative history or traditional canons of statutory construction.²¹⁸ Rather, the Court once again looked to its own precedents. First referring to *Benson*, the Court reasoned that “[t]he holding that the discovery of [the BCD-to-binary] method could not be patented as a ‘process’ forecloses a purely literal reading of § 101.”²¹⁹ The Court explained that, because “an algorithm, or mathematical formula, is like a law of nature, *Benson* applied the established rule that a law of nature cannot be the subject of a patent.”²²⁰ As evidence of the “established rule,” the Court quoted language from many of the cases discussed above, including *Le Roy*, *Morse*, *Cochrane*, *Tilghman*, *Mackay Radio*, and *Funk Bros.*²²¹ The

213. *Id.*

214. *Id.* at 588.

215. *Id.*

216. *Id.*

217. *Id.* at 588–89.

218. *Id.*

219. *Id.* at 589 (emphasis added) (citing *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972)).

220. *Id.* (citing *Benson*, 409 U.S. at 71–72) (emphasis added).

221. *Id.* at 589–92 (citing and quoting *Funk Bros. Seed Co. v. Kalo Inculant Co.*, 333 U.S. 127, 130 (1948); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939); *Tilghman v. Proctor*, 102 U.S. 707, 728 (1880); *Cochrane v. Deener*, 94 U.S. 780, 787–88 (1876); *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 112–21 (1853); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852)).

Court rejected the argument that, “if a process application implements a principle in some specific fashion, it automatically falls within the patentable subject matter of § 101.”²²² Rather, the Court explained, “[t]he rule that the discovery of a law of nature cannot be patented rests, not on the notion that natural phenomena are not processes, but rather on the more fundamental understanding that they are not the kind of ‘discoveries’ that the statute was enacted to protect.”²²³ As support for this proposition, the Court cited a patent law treatise.²²⁴

The patentee argued that, unlike the process in *Benson*, the claims at issue in *Flook* did not “wholly preempt the mathematical formula,” as the claims were limited to catalytic conversion processes, and they included additional steps such as updating the alarm limit.²²⁵ However, the Court rejected the “notion that *post-solution activity*, no matter how *conventional or obvious* in itself, can transform an unpatentable principle into a patentable process,” because any “competent draftsman could attach some form of post-solution activity to almost any mathematical formula,” thereby “exalt[ing] form over substance.”²²⁶

Thus, in analyzing the specific claims at issue, the *Flook* Court again appeared to adopt a two-step approach similar to that applied in *Funk Bros.*²²⁷ First, the Court identified what it viewed as the unpatentable “law of nature” or “idea” underlying the claims—in this case, the “mathematical algorithm” for calculating alarm limits.²²⁸

Second, the Court considered whether the claims recited some “inventive concept” beyond the mathematical algorithm itself.²²⁹ For this analysis, the Court reasoned that the mathematical algorithm, “as one of the ‘basic tools of scientific and technological work,’ [must be] treated as though it were a familiar part of the prior art.”²³⁰ In other words, the Court effectively analyzed *Flook*’s claim as though its novel algorithm were not part of the claim at all. The Court

222. *Parker v. Flook*, 437 U.S. 584, 593 (1978).

223. *Id.*

224. *Id.* at 593 n.15 (quoting P. ROSENBERG, *PATENT LAW FUNDAMENTALS* 4, at 13 (1975)).

225. *Id.* at 589–90.

226. *Id.* at 590 (emphasis added).

227. *See Funk Bros. Seed Co. v. Kalo Inculant Co.*, 333 U.S. 127, 131–32 (1948).

228. *Flook*, 437 U.S. at 589–90.

229. *Id.* at 594.

230. *Id.* at 591–92 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)); *see also id.* at 594.

explained that the claimed “process is unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because *once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention.*”²³¹ Essentially excising the algorithm of step 2 from the claim, the Court concluded that the remaining method steps were already well-known in the art, and on that basis concluded that Flook’s claim was not directed to patent-eligible subject matter:

Here it is absolutely clear that respondent’s *application* contains no claim of *patentable invention*. The chemical processes involved in catalytic conversion of hydrocarbons are *well known*, as are the practice of monitoring the chemical process variables, the use of alarm limits to trigger alarms, the notion that alarm limit values must be recomputed and readjusted, and the use of computers for “automatic monitoring-alarming.”²³²

The Court thus held that “the discovery of such a phenomenon [i.e., an algorithm or formula] cannot support a patent unless there is *some other inventive concept* in its application.”²³³ Summing up, the Court stated, “[v]ery simply, our holding today is that a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101.”²³⁴

The *Flook* Court recognized that the case raised significant policy issues as to the proper scope of patent protection, but it announced that it was up to Congress, not the Court, to resolve those policy issues.²³⁵ This was somewhat ironic, given that the Court never explained why Congress’s broad language in § 101 did not itself settle the question, nor did the Court identify the specific statutory basis for its rejection of Flook’s claims as patent ineligible. Indeed, the Court elsewhere indicated that its decision was based on the “absence of precedent [from its own case law] supporting

231. *Id.* at 594.

232. *Id.* at 594–95 (emphasis added).

233. *Id.* at 594.

234. *Id.* at 595 n.18.

235. *Id.* at 595–96. (“Difficult questions of policy concerning the kinds of programs that may be appropriate for patent protection and the form and duration of such protection can be answered by Congress on the basis of current empirical data not equally available to this tribunal. It is our duty to construe the patent statutes as they now read, in light of our prior precedents, and we must proceed cautiously when we are asked to extend patent rights into areas wholly unforeseen by Congress.”).

patentability”—case law, in fact, that the Court recognized was from a different era of technology.²³⁶

Justice Stewart dissented, joined by Chief Justice Burger and Justice Rehnquist.²³⁷ Justice Stewart took issue with the majority’s conflation of patent eligibility (§ 101) with the separate requirements of novelty (§ 102) and obviousness (§ 103):

The Court today says it does not turn its back on [its] well-settled precedents, but it strikes what seems to me an equally damaging blow at basic principles of patent law by importing into its inquiry under 35 U.S.C. § 101 the criteria of novelty and inventiveness. Section 101 is concerned only with subject-matter patentability. Whether a patent will actually *issue* depends upon the criteria of §§ 102 and 103, which include novelty and inventiveness, among many others. It may well be that under the criteria of §§ 102 and 103 no patent should issue on the process claimed in this case, because of anticipation, abandonment, obviousness, or for some other reason. But in my view the claimed process clearly meets the standards of subject-matter patentability of § 101.²³⁸

In 1981, three years after *Flook*, the Supreme Court decided *Diamond v. Diehr*.²³⁹ Similar to the “method for updating alarm limits” invalidated in *Flook*, the Court again considered the patent eligibility of an industrial process that included the use of a mathematical formula. The industrial process in *Diehr* was a process for molding and curing synthetic rubber.²⁴⁰ The claimed process generally comprised the steps of: (1) constantly measuring the temperature inside a rubber molding press; (2) feeding the measurements into a computer that would repeatedly recalculate the cure time using a known mathematical formula (the “Arrhenius equation”); and (3) causing the computer to signal a device to open the press at the optimal time.²⁴¹

236. *Id.* at 595 (“To a large extent our conclusion is based on reasoning derived from opinions written before the modern business of developing programs for computers was conceived. The youth of the industry may explain the complete absence of precedent supporting patentability.”).

237. *Id.* at 598 (Stewart, J., dissenting).

238. *Id.* at 600.

239. 450 U.S. 175 (1981).

240. *Id.* at 177.

241. *Id.* at 178–79 & n.5.

Unlike in *Flook*, however, the *Diehr* Court found that this process was a patent-eligible application of a mathematical formula.²⁴² In attempting to distinguish *Flook*, the Court reasoned as follows:

Parker v. Flook presented a similar situation. The claims were drawn to a method for computing an ‘alarm limit.’ An ‘alarm limit’ is simply a number and the Court concluded that the application sought to protect a formula for computing this number. . . . In contrast, the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber. Their process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of that equation. Rather, they seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process. These include installing rubber in a press, closing the mold, constantly determining the temperature of the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time.²⁴³

Focusing on the physical steps of the claimed process, the *Diehr* Court recited the dictum from *Cochrane v. Deener* defining the term “process,” stating as follows: “A process is a mode of treatment of certain materials to produce a given result. It is an act, or series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.”²⁴⁴ The Court further cited the related dictum from *Benson*: “Transformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.”²⁴⁵ The Court then applied this language to the patent at issue:

Analyzing respondents’ claims according to the above statements from our cases, we think that a physical and chemical process for molding precision synthetic rubber products falls within the § 101 categories of possibly

242. *Id.* at 192–93.

243. *Id.* at 186–87 (emphasis added).

244. *Id.* at 183 (quoting *Cochrane v. Deener*, 94 U.S. 780, 787–88 (1876)).

245. *Id.* at 184 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972)).

patentable subject matter. *That respondents' claims involve the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing cannot be disputed.* The respondents' claims describe in detail a step-by-step method for accomplishing such, beginning with the loading of a mold with raw, uncured rubber and ending with the eventual opening of the press at the conclusion of the cure. Industrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws.²⁴⁶

Justice Stevens dissented, joined by Justices Brennan, Marshall, and Blackmun.²⁴⁷ The dissent argued that the relevant facts of *Diehr* were “strikingly reminiscent” of those in *Flook*:

[*Flook*] involved the use of a digital computer in connection with a catalytic conversion process. During the conversion process, variables such as temperature, pressure, and flow rates were constantly monitored and fed into the computer; in [*Diehr*], temperature in the mold is the variable that is monitored and fed into the computer. In *Flook*, the digital computer repetitively recalculated the ‘alarm limit’—a number that might signal the need to terminate or modify the catalytic conversion process; in [*Diehr*], the digital computer repetitively recalculates the correct curing time—a number that signals the time when the synthetic rubber molding press should open.

The essence of the claimed discovery in both cases was an algorithm that could be programmed on a digital computer.²⁴⁸

In our view, *Flook* and *Diehr* are irreconcilable. They conflict in a number of respects:

First, the *Diehr* Court did not apply the two-step “inventive concept” analysis employed in *Flook* and previously employed in

246. *Id.* at 184 (emphasis added); see also *id.* at 192 (“[W]hen a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.” (emphasis added)).

247. *Id.* at 193 (Stevens, J., dissenting).

248. *Id.* at 209.

*Funk Bros.*²⁴⁹ Rather, the *Diehr* Court expressly held that “the ‘novelty’ of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories.”²⁵⁰

Second, *Diehr* retreated from *Flook’s* holding “that a mathematical algorithm must be assumed to be within the ‘prior art,’” as a literal application of this rule “would, if carried to its extreme, make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.”²⁵¹ The *Diehr* Court’s patent-eligibility analysis thus did *not* effectively excise the algorithm from the claims, in direct contrast to the methodology employed in *Flook*.

Third, *Flook* and *Diehr* are factually indistinguishable regarding the grounds relevant to the patent-eligibility inquiry. The *Diehr* Court purported to distinguish *Flook* under the theory that the claims in *Flook* sought to protect a “mathematical formula,” whereas “the respondents [in *Diehr*] do not seek to patent a mathematical formula.”²⁵² But that statement is simply not accurate. As discussed above, the applicant in *Flook* did not attempt to patent a mathematical formula. Instead, exactly as in *Diehr*, *Flook* attempted to patent an industrial process that simply used a mathematical formula in one of its steps. The *Diehr* Court further noted that the respondents’ “process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of

249. *See id.* at 204 (Stevens, J., dissenting) (noting that, “[u]nder [the *Flook*] procedure, the algorithm is treated for § 101 purposes as though it were a familiar part of the prior art; the claim is then examined to determine whether it discloses ‘some other inventive concept.’” (quoting *Parker v. Flook*, 437 U.S. 584, 591–95 (1978))).

250. *Id.* at 188–89; *see also id.* at 189–91 (“It has been urged that novelty is an appropriate consideration under § 101. Presumably, this argument results from the language in § 101 referring to any ‘new and useful’ process, machine, etc. Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection ‘subject to the conditions and requirements of this title.’ Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty. The question therefore of whether a particular invention is novel is ‘wholly apart from whether the invention falls into a category of statutory subject matter.’ . . . In this case, it 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. A rejection on either of these grounds does not affect the determination that respondents’ claims recited subject matter which was eligible for patent protection under § 101.” (citations omitted)).

251. *Id.* at 189 n.12.

252. *Id.* at 186–87.

that equation.”²⁵³ But this was equally true in *Flook*. Indeed, the *Flook* Court specifically noted that *Flook*’s claims did *not* “cover every conceivable application” of the applicant’s algorithm.²⁵⁴

The conflict between *Flook* and *Diehr* is even apparent in the lineup of the Justices in each case. In *Flook*, Justice Stevens authored the majority opinion (joined by Justices Brennan, Marshall, Blackmun, *White*, and *Powell*), and Justice Stewart dissented (joined by Chief Justice Burger and Justice Rehnquist).²⁵⁵ In *Diehr*, Justice Rehnquist authored the majority opinion (joined by Chief Justice Burger and Justices Stewart, *White*, and *Powell*), and Justice Stevens dissented (joined by Justices Brennan, Marshall and Blackmun).²⁵⁶ Notably, Justices *White* and *Powell* were the only Justices that were members of the majority in both cases. The inconsistencies between the Court’s opinions in *Flook* and *Diehr* thus appear to be explained by the fact that Justices *White* and *Powell* switched factions, for reasons unknown. In our view, the conflict between *Flook* and *Diehr* continues to generate significant confusion in the case law on § 101.

Following *Diehr*, the Supreme Court was largely silent regarding the issue of patent-eligible subject matter for nearly thirty years.²⁵⁷ Then, beginning in 2010, the Supreme Court decided three more cases concerning patent eligibility: *Bilski v. Kappos*,²⁵⁸ *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,²⁵⁹ and *Association for Molecular Pathology v. Myriad Genetics, Inc.*²⁶⁰ These cases substantially covered the gamut of patent-eligible subject matter, addressing the “abstract idea,” “law of nature,” and “physical phenomena” exceptions, respectively.

E. The Abstract Concept of Abstractness: Bilski

In *Bilski*, decided in 2010, the Supreme Court considered a patent application which claimed a method of hedging financial risk in commodities markets.²⁶¹ The application also included dependent

253. *Id.* at 187.

254. *Flook*, 437 U.S. at 586.

255. *Id.* at 584.

256. *Diehr*, 450 U.S. at 176.

257. The one exception was *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124 (2001), which concerned statutory provisions specific to the protection of crossbred plants.

258. 130 S. Ct. 3218 (2010).

259. 132 S. Ct. 1289 (2012).

260. 133 S. Ct. 2107 (2013).

261. *Bilski*, 130 S. Ct. at 3224. Claim 1 of the patent application in *Bilski* reads as follows:

claims limiting the method's use to "energy" commodities, as well as a claim directed to using well-known random analysis techniques to determine how much a seller would gain from each transaction under different weather patterns.²⁶² The Court held that all claims failed to recite patent-eligible subject matter under § 101.²⁶³ In doing so, the Court affirmed the judgment of the U.S. Court of Appeals for the Federal Circuit, but rejected the lower court's reasoning.

In an effort to clarify the confused state of patent-eligibility jurisprudence, the Federal Circuit, sitting en banc, had adopted the "machine-or-transformation test" as the "sole test" governing the patent eligibility of a claimed "process."²⁶⁴ Under this test, a claimed process would be patent eligible under § 101 only if: "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."²⁶⁵ In the Federal Circuit's view, the Supreme Court had "enunciated" this as the "definitive test" for the patent eligibility of a process, based on statements made by the Court in *Cochrane*, *Benson*, *Flook*, and *Diehr*.²⁶⁶ Finding that the claimed method of hedging risk did not satisfy either prong of the

A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:

- (a) initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumers;
- (b) identifying market participants for said commodity having a counter-risk position to said consumers; and
- (c) initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.

In re Bilski, 545 F.3d 943, 949 (Fed. Cir. 2008) (en banc); see also *Bilski*, 130 S. Ct. at 3223–24 (same).

262. *Bilski*, 130 S. Ct. at 3224.

263. *Myriad*, 133 S. Ct. at 2111, 2116–18.

264. *Id.* at 3224 (quoting *In re Bilski*, 545 F.3d at 954–56).

265. *Id.* (quoting *In re Bilski*, 545 F.3d at 954).

266. See *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008) (quoting *Diamond v. Diehr*, 450 U.S. 175, 192 (1981) (holding that use of mathematical formula in process "transforming or reducing an article to a different state or thing" constitutes patent-eligible subject matter); *Parker v. Flook*, 437 U.S. 584, 589 n.9 (1978) ("An argument can be made [that the Supreme] Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a 'different state or thing.'"); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972) ("Transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."); *Cochrane v. Deener*, 94 U.S. 780, 788 (1876) ("A process is . . . an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.")).

machine-or-transformation test, the Federal Circuit found that all claims failed to recite patent-eligible subject matter under § 101.²⁶⁷

In reviewing the Federal Circuit's decision, the *Bilski* Court began by reaffirming that "[t]he Court's precedents provide three specific exceptions to § 101's broad patent eligibility principles: 'laws of nature, physical phenomena, and abstract ideas.'"²⁶⁸ For perhaps the first time, the Court openly conceded that "these exceptions are *not required by the statutory text*," although it opined—without explanation—that "they are consistent with the notion that a patentable process must be 'new and useful.'"²⁶⁹ Citing the famous dicta of *Le Roy v. Tatham*, the Court reasoned that, "in any case, these exceptions have defined the reach of the statute as a matter of statutory *stare decisis* going back 150 years."²⁷⁰ And thus, the Court reaffirmed the authority of its own precedents, divorced from any actual statutory interpretation.²⁷¹

However, in reviewing the Federal Circuit's adoption of the machine-or-transformation test, the Court inconsistently cautioned that "courts should not read into the patent laws limitations and conditions which the legislature has not expressed."²⁷² The Court further stated that, "as in all statutory construction, '[u]nless otherwise defined, words will be interpreted as taking their ordinary, contemporary, common meaning.'"²⁷³ "Any suggestion in this Court's case law that the Patent Act's terms deviate from their ordinary meaning [had] only been an explanation for the exceptions for laws of nature, physical phenomena, and abstract ideas"—i.e., the exceptions to the statute that the Supreme Court had itself created.²⁷⁴

267. *Bilski*, 545 F.3d at 963–66.

268. *Bilski*, 130 S. Ct. at 3225 (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

269. *Id.* (emphasis added).

270. *Id.* (citing *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 174–75 (1852)); *see also supra* note 82 and accompanying text.

271. Given the history of the Supreme Court's patent-eligibility jurisprudence reviewed here, and the Court's own recognition in *Bilski* that its judicial exceptions to section 101 are beyond the statutory text, it is somewhat ironic that the Court concluded its analysis in *Bilski* with the statement that, "[t]oday, the Court once again declines to impose limitations on the Patent Act that are inconsistent with the Act's text." *Bilski*, 130 S. Ct. at 3231.

272. *Id.* at 3226 (citations omitted) (quoting *Diamond v. Diehr*, 450 U.S. 175, 182 (1981)) (internal quotation marks omitted).

273. *Id.* (quoting *Diamond v. Diehr*, 450 U.S. 175, 182 (1981) (internal quotation marks omitted)).

274. *Id.*

The Court reasoned that it was “unaware of any ‘ordinary, contemporary, common meaning’ of the definitional terms ‘process, art or method’ that would require these terms to be tied to a machine or to transform an article.”²⁷⁵ The Court had never endorsed the machine-or-transformation test as the “exclusive test” for the patent eligibility of a process; rather, in *Benson*, the Court had “explicitly declined to ‘hold that no process patent could ever qualify if it did not meet [machine or transformation] requirements.’”²⁷⁶ Thus, the Court held that, while the “machine-or-transformation test is a *useful and important clue, an investigative tool*, . . . [it] is not the *sole* test for deciding whether an invention is a patent-eligible ‘process.’”²⁷⁷ The Court further rejected arguments that computer programs²⁷⁸ and business methods²⁷⁹ were *per se* excluded from patent eligibility.

The *Bilski* Court declined to “define further what constitutes a patentable ‘process.’”²⁸⁰ Instead, the Court directed lower courts to “look[] to the guideposts in *Benson*, *Flook*, and *Diehr*.”²⁸¹ These precedents, the Court held, show that the claims at issue recited unpatentable “abstract ideas.”²⁸² But aside from referring to *Benson*, *Flook*, and *Diehr*, the Court did not explain how lower courts should assess whether a claim is directed to non-statutory subject matter as an “abstract idea.” The Court did not define what an “abstract idea” is in this context. The Court also did not explain how to distill an “abstract idea” from a claim, nor did it identify the types of claim elements that may be disregarded—for example, as mere “post-solution activity”—in determining whether a claim is impermissibly directed to an “abstract idea.”

Turning to *Bilski*’s claims, the Court characterized two claims as broadly reciting the “concept of hedging, or protecting against risk,” which the Court held was “an unpatentable abstract idea, just like the

275. *Id.* (quoting *Diamond v. Diehr*, 450 U.S. 175, 182 (1981)).

276. *Id.* at 3227 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972)).

277. *Id.* (emphasis added).

278. *Id.* at 3227 (“It is true that patents for inventions that did not satisfy the machine-or-transformation test were rarely granted in earlier eras But this fact does not mean that unforeseen innovations such as computer programs are always unpatentable.”).

279. *Id.* at 3228 (“Section 101 similarly precludes the broad contention that the term ‘process’ categorically excludes business methods.”).

280. *Id.* at 3231.

281. *Id.*

282. *Id.* at 3229–30.

algorithms at issue in *Benson* and *Flook*.²⁸³ As in *Benson*, the Court reasoned that “[a]llowing petitioners to patent risk hedging would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.”²⁸⁴

The Court characterized the narrower claims as “broad examples of how hedging can be used in commodities and energy markets.”²⁸⁵ In finding these claims invalid, the Court cited *Flook* for the principle that “limiting an abstract idea to one field of use or adding token postsolution components did not make the concept patentable.”²⁸⁶ In the Court’s view, “[t]hese claims attempt to patent the use of the abstract idea of hedging risk in the energy market and then instruct the use of well-known random analysis techniques to help establish some of the inputs into the equation”—limitations which the Court reasoned “add even less to the underlying abstract principle than the invention in *Flook*, [which] was at least directed to the narrower domain of signaling dangers in operating a catalytic converter.”²⁸⁷

Notably, in relying on *Flook* to find that mere “field of use” limitations and “token postsolution” activity did not render an underlying abstract idea patent eligible, the *Bilski* Court effectively applied the two-step “inventive concept” analysis employed in *Flook* and *Funk Bros.*, even if it did not explicitly acknowledge doing so.²⁸⁸

F. Return of the “Inventive Concept”: Mayo

Two years later, in the 2012 case of *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, the Supreme Court unanimously reaffirmed its two-step “inventive concept” analysis, finding that a claimed medical diagnostic method was not patent

283. *Id.* at 3231.

284. *Id.*

285. *Id.*

286. *Id.*

287. *Id.*

288. *See id.* at 3230 (quoting *Parker v. Flook*, 437 U.S. 584, 589–90 (1978)) (rejecting the proposition that “post-solution activity, *no matter how conventional or obvious in itself*, can transform an unpatentable principle into a patentable process” (emphasis added)). Indeed, the *Bilski* Court repeatedly stressed the lack of inventiveness in the claimed method steps. *See id.* at 3231 (“Hedging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class.” (quoting *In re Bilski*, 545 F.3d 943, 1013 (2008) (Rader, J., dissenting))); *id.* at 3224, 3231 (holding that the addition of “well-known random analysis techniques” did not make the claimed method of hedging patent eligible) (emphasis added).

eligible.²⁸⁹ The patent claims at issue in *Mayo* were directed to a method of determining the optimal dosage of thiopurine drugs for patients with autoimmune diseases.²⁹⁰ Because the way in which patients metabolize thiopurine varies, it was difficult to determine whether a patient's dosage was too high (risking harmful side effects) or too low (and thus possibly ineffective).²⁹¹ However, the patentees discovered that certain concentrations of thiopurine metabolites in the blood were correlated with the dosage level being either too high or too low.²⁹² The patentees claimed this discovery in the form of process claims that generally recited the following method steps: (1) an "administering" step—giving a patient a dose of thiopurine; (2) a "determining" step—measuring the patient's thiopurine metabolite level; and (3) a "wherein" step—wherein a metabolite level below or above specific threshold levels "indicate[s] a need" to respectively increase or decrease the thiopurine dosage.²⁹³

The *Mayo* Court began by reiterating its "long held" rule that "[l]aws of nature, natural phenomena, and abstract ideas are not patentable."²⁹⁴ These "are the basic tools of scientific and technological work," the Court explained, the monopolization of which "might tend to impede innovation more than it would tend to promote it."²⁹⁵ The Court noted that, "to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'"²⁹⁶ The Court proceeded to analyze the claimed method under its two-step "inventive concept" framework.

First, the Court identified the "law of nature" underlying the claims, which it characterized as "relationships between the concentration in the blood of certain thiopurine metabolites and the likelihood that the drug dosage will be ineffective or induce harmful side effects."²⁹⁷ The Court reasoned that these relationships were "a consequence of the ways in which thiopurine compounds are

289. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1305 (2012).

290. *Id.* at 1294–95.

291. *Id.* at 1295.

292. *Id.*

293. *Id.*; *see also id.* at 1297 (characterizing the claims as having "administering," "determining," and "wherein" steps).

294. *Id.* at 1293 (citations omitted) (internal quotation marks omitted).

295. *Id.* (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)).

296. *Id.* at 1294.

297. *Id.*; *see also id.* at 1296 (same).

metabolized by the body—entirely natural processes”—and thus were not patent eligible.²⁹⁸

Second, the Court expressly held that, to be patent eligible, “a process that focuses upon the use of a natural law [must] also contain other elements or a combination of elements, sometimes referred to as an ‘*inventive concept*,’ sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself.”²⁹⁹ Under this analysis, the Court explained, pre- or “‘post-solution activity’ that is purely ‘conventional or obvious . . . can[not] transform an unpatentable principle into a patentable process.’”³⁰⁰

Reviewing its precedents, the Court noted that it had previously applied the “inventive concept” analysis in *Flook*,³⁰¹ *Funk Bros.*,³⁰² and *Bilski*.³⁰³ The *Mayo* Court also suggested that it applied the “inventive concept” analysis in *Diehr*.³⁰⁴ The *Mayo* Court reasoned that *Diehr* had “nowhere suggested that all [of the claimed] steps [in the rubber curing process], or at least the combination of those steps, were in context *obvious, already in use, or purely conventional*.”³⁰⁵ In the *Mayo* Court’s view, “[t]hese other steps apparently added to the formula something that in terms of patent law’s objectives had significance—they transformed the process into an *inventive application* of the formula.”³⁰⁶

The *Mayo* Court turned *Diehr* on its head. In analyzing subject-matter eligibility, the *Diehr* Court never considered whether the

298. *Id.* at 1297.

299. *Id.* at 1294 (emphasis added) (citing *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

300. *Id.* at 1298–99 (quoting *Flook*, 437 U.S. at 589, 590).

301. *Id.* at 1294 (citing *Flook*, 437 U.S. at 594); *id.* at 1299 (noting that, in *Flook*, “the notion that alarm limit values must be recomputed and readjusted, and the use of computers for ‘automatic monitoring-alarming’ were all ‘well known,’ to the point where, putting the formula to the side, there was no ‘inventive concept’ in the claimed application of the formula” (quoting *Flook*, 437 U.S. at 594)).

302. *Id.* at 1294 (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)) (“If there is to be invention from [a discovery of a law of nature], it must come from the application of the law of nature to a new and useful end.”).

303. *Id.* (quoting *Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (“[T]he prohibition against patenting abstract ideas ‘cannot be circumvented by attempting to limit the use of the formula to a particular technological environment’ or adding ‘insignificant postsolution activity.’” (citation omitted)); *id.* at 1300–01 (quoting *Bilski*, 130 S. Ct. at 3231) (acknowledging the fact that some claims limited the method of hedging to energy markets and specified “well-known random analysis techniques . . . did not make the concept patentable”).

304. *Id.* at 1298–99 (citing *Diamond v. Diehr*, 450 U.S. 175, 177–79, 187 (1981)).

305. *Id.* at 1299 (emphasis added) (citing *Diehr*, 450 U.S. at 187).

306. *Id.* (emphasis added).

claimed process entailed an “inventive application” of the Arrhenius formula. To the contrary, *Diehr* expressly held that the novelty and subject-matter eligibility inquiries entail completely separate determinations: “[t]he question therefore of whether a particular invention is novel is wholly apart from whether the invention falls into a category of statutory subject matter.”³⁰⁷ As the *Diehr* Court elaborated, “the ‘novelty’ of any element or steps in a process, or even of the claimed process as a whole, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories.”³⁰⁸ In an attempt to reconcile its precedents, the *Mayo* Court engaged in some revisionist history.

In any event, applying the “inventive concept” test to the case at hand, the *Mayo* Court found that the claims at issue did not “add *enough* to their statements of the [metabolite] correlations” to satisfy the test.³⁰⁹ The Court reasoned that “the steps in the claimed processes (apart from the natural laws themselves) involve[d] well-understood, routine, conventional activity previously engaged in by researchers in the field.”³¹⁰ For example, with respect to the claimed “administering” step, the Court noted that “doctors used thiopurine drugs to treat patients suffering from autoimmune disorders long before anyone asserted these claims.”³¹¹ Similarly, the Court reasoned that the “determining” step of testing a patient’s metabolite levels merely “tells doctors to engage in well-understood, routine, conventional activity previously engaged in by scientists who work in the field.”³¹² The Court further viewed the “wherein” step as merely “tell[ing] a doctor about the relevant natural laws” and suggesting to “take those laws into account” when treating a patient.³¹³ Finally, the Court found that reciting these three steps in an ordered combination added nothing inventive to the underlying laws of nature, as “[a]nyone who wants to make use of these laws must first administer a thiopurine drug and measure the resulting metabolite concentrations.”³¹⁴

307. *Diehr*, 450 U.S. at 190 (internal quotation marks omitted).

308. *Id.* at 188–189.

309. *Mayo*, 132 S. Ct. at 1297.

310. *Id.* at 1294.

311. *Id.* at 1297.

312. *Id.*

313. *Id.* at 1291, 1297.

314. *Id.* at 1298.

In addition to applying the “inventive concept” analysis, the *Mayo* Court also emphasized general concerns regarding preemption.³¹⁵ The Court again cited *Morse*—an enablement case³¹⁶—for the proposition that a patent claim must not be so broad as to “inhibit further discovery by improperly tying up the future use of laws of nature.”³¹⁷ In applying this amorphous principle to the claims at issue, the Court reasoned as follows:

The laws of nature at issue here are narrow laws that may have limited applications, but the patent claims that embody them nonetheless implicate this concern. They tell a treating doctor to measure metabolite levels and to consider the resulting measurements in light of the statistical relationships they describe. In doing so, *they tie up the doctor’s subsequent treatment decision* whether that treatment does, or does not, change in light of the inference he has drawn using the correlations. And they *threaten to inhibit the development of more refined treatment recommendations . . .* that combine [the patentee’s] correlations with later discovered features of metabolites, human physiology or individual patient characteristics.³¹⁸

The *Mayo* Court additionally rejected the theory, applied by the Federal Circuit below, that the machine-or-transformation test rendered the claims patent eligible “since they involve transforming the human body by administering a thiopurine drug and transforming the blood by analyzing it to determine metabolite levels.”³¹⁹ The Court held that these transformations were “irrelevant” and that, at any rate, “in stating that the ‘machine-or-transformation’ test is an ‘important and useful clue’ to patentability, we have neither said nor implied that the test trumps the ‘law of nature’ exclusion.”³²⁰

Finally, in finding the patent claims invalid, the *Mayo* Court suggested that the claimed *diagnostic* method may be distinguishable from drug *treatment* methods: “Unlike, say, a typical patent on a new drug or a new way of using an existing drug, the patent claims do not

315. *Id.* 1292, 1294, 1299.

316. *See supra* notes 92–98 and accompanying text.

317. *Mayo*, 132 S. Ct. at 1301.

318. *Id.* at 1302 (emphasis added).

319. *Id.*

320. *Id.* at 1303 (emphasis added) (quoting *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010)).

confine their reach to particular applications of [natural] laws.”³²¹ However, the Court offered no explanation or reasoning to support any such distinction.

In fact, such a distinction—between diagnostic methods and drug treatment methods—would make little sense within the framework of the *Mayo* Court’s analysis. Consider a patent directed to the novel discovery that an existing drug known to treat disease *X* can also be administered to treat disease *Y*. The patentee accordingly files for a “typical” patent on this “new way of using an existing drug.”³²² But under *Mayo*, the fact that this drug can treat disease *Y* is surely a “law of nature,” because the drug’s therapeutic effects on disease *Y* are the “consequence of . . . entirely natural processes.”³²³ The specific manner in which the drug is administered—e.g., orally or intravenously—is also surely conventional. As a result, the claimed method would presumably be patent ineligible under *Mayo*, as there is no “inventive concept” supporting the treatment method aside from the “law of nature” that the drug can treat disease *Y*. Precisely because patents directed to drug treatment methods such as this are, in fact, “typical,” applying *Mayo*’s law of nature/inventive concept test would have a devastating effect on the U.S. pharmaceutical industry. This is no doubt why the *Mayo* Court attempted to waive off such fears—even while failing to provide a principled basis for distinguishing patent-ineligible diagnostic methods from drug treatment methods.

G. Retreat of the “Inventive Concept”: Myriad

The Supreme Court issued its most recent decision regarding patent eligibility on June 13, 2013, in the case of *Association for Molecular Pathology v. Myriad Genetics, Inc.*³²⁴ In that case, Myriad had discovered the precise location and coding of two human DNA sequences—the BRCA1 and BRCA2 genes—which, when mutated, indicate a substantially increased risk of breast or ovarian cancer.³²⁵ This knowledge enabled Myriad to develop tests for assessing cancer risk by analyzing a patient’s DNA.³²⁶ Myriad sought to patent its

321. *Id.* at 1302.

322. *Id.* at 1302.

323. *Id.* at 1297.

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

325. *Id.* at 2110–11.

326. *Id.* at 2109.

discovery in the form of “composition of matter” claims directed to (a) “isolated” DNA sequences relating to the BRCA1 and BRCA2 genes; and (b) synthetically created DNA sequences, known as complementary DNA (“cDNA”), derived from the BRCA1 and BRCA2 genes.³²⁷ For the reasons below, the Court unanimously held that cDNA is (generally) a patent-eligible “composition of matter,” whereas isolated DNA is an unpatentable “product of nature.”³²⁸

Human DNA in its natural state is encoded with a sequence of millions of chemically joined nucleotide pairs, with the nucleotide pairs connected by covalent bonds in a “double helix” structure.³²⁹ Contiguous segments of the DNA’s nucleotide sequence known as “*exons*” contain coding information for creating amino acids.³³⁰ The remaining segments, which do not code for amino acids, are known as “*introns*.”³³¹ The BRCA1 and BRCA2 sequences discovered by Myriad are each about eighty thousand nucleotides long.³³² If only the exon sequences are counted, BRCA1 is about 5,500 nucleotides long, and BRCA2 is about 10,200 nucleotides long.³³³

Two DNA manipulation techniques were relevant to Myriad’s patent claims. First, well-known laboratory methods could be used to isolate segments of DNA—e.g., the BRCA1 or BRCA2 sequences, or any contiguous segment thereof—by breaking the covalent bonds that connect the segment to the rest of the DNA sequence.³³⁴ Second, other well-known laboratory methods could be used to create cDNA by synthetically removing all intron sequences from a DNA segment, leaving only the exon sequences behind (which remain sequenced in their natural order, save for the absence of any intervening introns).³³⁵ As stated, Myriad’s patents recited multiple “composition of matter” claims directed to isolated DNA and to cDNA.³³⁶

The Court began its analysis by reiterating the exceptions to § 101: “Laws of nature, natural phenomena, and abstract ideas are

327. *Id.* at 2111–12.

328. *Id.* at 2117, 2119.

329. *Id.* at 2111, 2114.

330. *Id.* at 2111.

331. *Id.*

332. *Id.* at 2112.

333. *Id.*

334. *Id.*

335. *Id.*

336. *Id.* at 2113.

not patentable.”³³⁷ However, the Court cautioned that this rule “is not without limits,” as “‘all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas,’ and ‘too broad an interpretation of this exclusionary principle could eviscerate patent law.’”³³⁸ The Court framed the ultimate issue by quoting the language of § 101, stating that “[w]e must apply this well-established standard to determine whether Myriad’s patents claim any ‘*new and useful . . . composition of matter.*’”³³⁹

The Court first considered Myriad’s claims directed to isolated DNA. Claim 1, for example, recited “[a]n isolated DNA coding for a BRCA1 polypeptide”—i.e., the entire isolated BRCA1 sequence.³⁴⁰ Claim 5 similarly recited “[a]n isolated DNA having at least 15 nucleotides of the DNA of claim 1,” effectively claiming any isolated DNA segment containing a sequence of fifteen or more nucleotides found within the BRCA1 sequence.³⁴¹ In analyzing these claims, the Court stated the following:

It is undisputed that Myriad did not create or alter any of the genetic information encoded in the BRCA1 and BRCA2 genes. The location and order of the nucleotides *existed in nature before Myriad found them*. Nor did Myriad create or alter the genetic structure of DNA. Instead, Myriad’s principal contribution was uncovering the precise location and genetic sequence of the BRCA1 and BRCA2 genes within chromosomes 17 and 13.³⁴²

The Court compared Myriad’s isolated DNA claims to *Chakrabarty*, in which the Court had held that a claim to a modified bacterium was patent eligible because “the patent claim was ‘not to a hitherto unknown natural phenomenon, but to a *nonnaturally occurring* manufacture or composition of matter.’”³⁴³ In contrast, the Court reasoned, “Myriad *found* the location of the BRCA1 and BRCA2

337. *Id.* at 2116 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1290 (2012)).

338. *Id.* at 2116.

339. *Id.* (emphasis added) (quoting 35 U.S.C. § 101 (2006)).

340. *Id.* at 2113.

341. *Id.*

342. *Id.* at 2116 (emphasis added).

343. *Id.* at 2116–17 (emphasis added) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980)).

genes, but that discovery, by itself, does not render the BRCA genes ‘new . . . composition[s] of matter’ that are patent eligible.”³⁴⁴ The act of isolating a naturally occurring DNA sequence did not change this conclusion, the Court held, as merely “separating that gene from its surrounding genetic material is not an act of invention.”³⁴⁵ Accordingly, the Court held that “naturally occurring, isolated DNA segments” are “product[s] of nature” which are not patent eligible.³⁴⁶

The Court next turned to Myriad’s cDNA claims. Claim 2, for example, recited cDNA derived from isolated BRCA1—i.e., a nucleotide sequence containing only the exons from BRCA1, with all intervening introns removed.³⁴⁷ Claim 6 similarly recited “[a]n isolated DNA having at least fifteen nucleotides of the DNA of claim 2,” effectively claiming any sequence of fifteen or more nucleotides found within cDNA derived from the BRCA1 sequence.³⁴⁸

The Court reasoned that “cDNA does not present the same obstacles to patentability as naturally occurring, isolated DNA segments,” because “creation of a cDNA sequence . . . results in an exons-only molecule that is *not naturally occurring*.”³⁴⁹ The Court found it irrelevant that “[t]he nucleotide sequence of [the exons in] cDNA is dictated by nature, not by the lab technician.”³⁵⁰ The key fact, the Court held, was that “the lab technician unquestionably creates something *new* when cDNA is made.”³⁵¹ As a result, the Court held, “cDNA is not a ‘product of nature’ and is patent eligible under § 101.”³⁵² The one exception, the Court held, was for “very short series of DNA [with] no intervening introns to remove when creating cDNA,” resulting in cDNA that is still “indistinguishable

344. *Id.* at 2117 (emphasis added) (quoting 35 U.S.C. § 101 (2006)).

345. *Id.*; *see also id.* at 2118 (“Nor are Myriad’s claims saved by the fact that isolating DNA from the human genome severs chemical bonds and thereby creates a nonnaturally occurring molecule. Myriad’s claims are simply not expressed in terms of chemical composition, nor do they rely in any way on the chemical changes that result from the isolation of a particular section of DNA. Instead, the claims understandably focus on the genetic information encoded in the BRCA1 and BRCA2 genes.”).

346. *Id.* at 2119.

347. *Id.* at 2113.

348. *Id.*

349. *Id.* at 2119 (emphasis added).

350. *Id.*

351. *Id.* (emphasis added).

352. *Id.*

from natural DNA.”³⁵³ Thus, the determinative factor in the Court’s analysis was whether the exact nucleotide sequence claimed is “naturally occurring.”³⁵⁴ In this regard, we view *Myriad* as representing a significant (and welcome) departure from the Supreme Court’s “inventive concept” jurisprudence.

As we have surveyed above, the Supreme Court’s “inventive concept” jurisprudence—beginning with *Funk Bros.* and continuing in at least *Flook*, *Bilski*, and *Mayo*—generally teaches the following: The fact that a patent claim is not specifically directed to a verboten judicial exception does not suffice to render the claim patent eligible. Instead, the claim must include some specific “inventive” concept separate and apart from the ineligible subject matter. For example, the patentee in *Funk Bros.* claimed a non-naturally occurring mixture of inoculants that was not, *per se*, a “law of nature”—or even a “product of nature.” The problem for the Court was that, putting aside the discovery of the law of nature and the naturally occurring inoculants individually, the claimed mixture “is hardly more than an advance in the packaging of the inoculants.”³⁵⁵ In other words, the claims lacked an inventive concept beyond the patent-ineligible elements of the patentee’s discovery. Similarly in *Mayo*, the claims were not directed to a law of nature *per se*, but rather to a diagnostic method that applied a law of nature. But because the application involved merely conventional “post-solution activity,” the claims were deemed directed to patent-ineligible subject matter.

Myriad completely abandoned—*sub silentio*—the Court’s prior “inventive concept” framework. The Court’s determination that the claimed cDNA was not “naturally occurring” ended the patent-eligibility analysis. The Court did not proceed to apply an “inventive concept” test, or examine whether the (patent-eligible) cDNA

353. *Id.* Although the Court did not elaborate as to which specific claims were invalidated by its holding, this exception suggests that Claim 2 (cDNA containing all exons from BRCA1) was patent eligible, whereas Claim 6 (any 15+ nucleotide sequence found in the cDNA of Claim 2) was not patent eligible. Individual exons often contain more than 15 nucleotides. *See, e.g.*, I. Dunham et al., *The DNA Sequence of Human Chromosome 22*, 402 NATURE, 489, 491 (1999) (finding on chromosome 22 a mean exon length of 266 nucleotide base pairs and a median exon length of 135 nucleotide base pairs). As such, Claim 6 likely encompassed at least some nucleotide sequences found entirely within an individual exon—i.e., a “very short series of DNA [with] no intervening introns to remove when creating cDNA.” *Myriad*, 133 S. Ct. at 2119.

354. *Myriad*, 133 S. Ct. at 2119.

355. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 131 (1948).

differed from the (patent-ineligible) isolated DNA as a result of mere “post-solution” activity.

Perhaps most notably, the facts in *Myriad* were neatly aligned for another application of the Court’s “inventive concept” test. The patentee’s discovery was undoubtedly a “law of nature” in the lexicon of *Funk Bros.* and *Mayo*: the patentee discovered that DNA sequences at a “precise location” in the human genome are associated with a significant increase in an individual’s risk of developing breast and ovarian cancer when mutated.³⁵⁶ The patentee could not claim those isolated DNA sequences (the BRCA1 and BRCA2 genes), because such claims are directed to a “product of nature,” which is *per se* patent ineligible.³⁵⁷ The patentee also applied well-known processes to those patent-ineligible DNA sequences to produce cDNA sequences. In fact, the Court even expressly acknowledged that the cDNA was created through “processes similarly well known in the field of genetics.”³⁵⁸ Nevertheless, the Court held that cDNA was patent eligible under § 101—despite the fact that those claims were based on nothing more than applying well-known processes (cDNA synthesizing techniques) to the patent-ineligible discovery of the BRCA1 and BRCA2 genes.³⁵⁹ The Court required no “inventive concept” beyond the patent-ineligible discovery of the patentee.³⁶⁰ Instead, the Court applied a bright-line rule, determining simply whether the claimed subject matter was naturally occurring or not.³⁶¹

The Court’s decision in *Myriad* diverged from prior case law in other significant respects as well. Importantly, the *Myriad* Court omitted any discussion of concerns relating to “preemption,” which factored heavily in the Court’s prior decisions in *Benson*, *Flook*, *Diehr*, *Bilski*, and *Mayo*.³⁶² Indeed, the Court did not once utter any

356. *Myriad*, 133 S. Ct. at 2110–11.

357. *Id.* at 2111.

358. *Id.* at 2112.

359. *Id.* at 2111.

360. *Id.*

361. *Id.* at 2111, 2121.

362. See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012) (noting that the Court’s cases “warn us against upholding patents that claim process that too broadly preempt the use of a natural law”); *Bilski v. Kappos*, 130 S. Ct. 3218, 3231 (2010) (“Allowing petitioners to patent risk hedging would pre-empt use of this approach in all fields and would effectively grant a monopoly over an abstract idea.”); *Diamond v. Diehr*, 450 U.S. 175, 187 (1981) (“Their process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of that equation. Rather, they seek only to foreclose from

variation of the word “preempt” in the *Myriad* opinion. In finding isolated DNA patent ineligible, the Court focused solely on the fact that the specific sequence claimed was “naturally occurring”—i.e., a “product of nature.”³⁶³ The Court did not seek to justify this holding by referring to concerns that downstream uses of the isolated DNA would be preempted. Similarly, in finding cDNA patent *eligible*, the Court again focused solely on the fact that the specific nucleotide sequence claimed was “*not* naturally occurring.”³⁶⁴ In other words, unlike DNA, the cDNA was a “*new . . . composition[] of matter*” and therefore was patent eligible under § 101.³⁶⁵ The Court did not analyze what quantum of downstream innovation might be preempted by the patent claims covering cDNA sequences derived from the BRCA1 and BRCA2 genes.

Finally, it is notable that the *Myriad* Court did not even cite the prior cases of *Le Roy*, *Morse*, *Rubber-Tip Pencil*, *Cochrane*, *Dolbear*, *Mackay Radio*, *Benson*, *Flook*, *Diehr*, or *Bilski*—precedents which have typically been cited *ad nauseum* in patent-eligibility cases. Rather, the *Myriad* Court relied heavily on *Chakrabarty*, a case in which the Court took perhaps its most expansive view of patent eligibility in noting that “Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’”³⁶⁶

As will be discussed throughout the remainder of this Article, we believe that *Myriad*’s foregoing deviations from precedent present an opportunity for the Supreme Court to hit “reset” on its patent-eligibility jurisprudence, providing a new foundation for a clear and workable framework that is firmly grounded in the statutory text.

others the use of that equation in conjunction with all of the other steps in their claimed process.”); *Parker v. Flook*, 437 U.S. 584, 590 (1978) (finding claim directed to patent-ineligible subject matter, even though the claim technically did not “wholly preempt” the underlying mathematical formula); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972) (“The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly preempt the mathematical formula and in practical effect would be a patent on the algorithm itself.”).

363. *Myriad*, 133 S. Ct. at 2111, 2116–18.

364. *Id.* at 2111, 2119 (emphasis added).

365. *Id.* at 2110 (emphasis added).

366. *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. REP. NO. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess., 6 (1952)); *see also Myriad*, 133 S. Ct. at 2109 (“*Diamond v. Chakrabarty* is central to the patent eligibility inquiry . . .”).

IV. THE SYMPTOMS: CONFOUNDING THE LOWER COURTS

The concerns Justice Frankfurter expressed in his concurring opinion in *Funk Bros.*—that it “only confuses the issue” to “introduce such terms as ‘the work of nature’ and the ‘laws of nature’” into the § 101 analysis³⁶⁷—proved prescient. The “vague and malleable terms” on which the Supreme Court erected its “judicial exceptions” to § 101 have sown confusion and disagreement in the lower courts tasked with the difficult job of applying inconsistent Supreme Court precedents.³⁶⁸ The Supreme Court’s renewed interest in patent-eligible subject matter beginning with *Bilski* has only exacerbated confusion in the lower courts.

Nowhere has the chaos wrought by the Supreme Court’s patent-eligibility jurisprudence been more pronounced than in the case of *CLS Bank International v. Alice Corp. Pty Ltd.*, recently decided by the Federal Circuit en banc.³⁶⁹ In *CLS Bank*, the Federal Circuit set out to clarify the Supreme Court’s “abstract idea” exception to § 101 as it pertains to software-related claims.³⁷⁰ The result, however, was inconclusive at best, as no majority of the en banc panel could agree on a coherent interpretation of the relevant Supreme Court case law.

The claims at issue in *CLS Bank* were directed to a computerized trading platform for settling financial transactions using a trusted third-party intermediary.³⁷¹ There were three types of claims at issue: method claims, computer-readable medium, and system claims.³⁷² The method claims generally claimed the following steps: (1) creating a “shadow record” that mirrors the accounts for each party; (2) obtaining a start-of-day balance for each party; (3) adjusting the shadow records for each transaction throughout the day; and (4) instructing, at the end of each day, the parties to settle the trades for which funds are available.³⁷³ The parties stipulated that these claims required computer implementation.³⁷⁴ The computer-readable medium claims recited “computer readable storage medium

367. *Funk Bros.*, 333 U.S. at 134–35 (Frankfurter, J., concurring).

368. *Id.*

369. *CLS Bank Int’l v. Alice Corp. Pty. Ltd.*, 717 F.3d 1269 (Fed. Cir. 2013) (en banc).

370. *Id.* at 1277 (Lourie, J., concurring) (explaining that “[w]hat is needed is a consistent, cohesive, and accessible approach to the § 101 analysis—a framework that will provide guidance and predictability for patent applicants and examiners, litigants, and the courts”).

371. *Id.* at 1274.

372. *Id.* at 1274, 1284.

373. *Id.* at 1285.

374. *Id.*

having computer readable program code” for performing the same method.³⁷⁵ Likewise, the system claims recited a “data processing system,” a “data storage unit,” and a “computer” programmed specifically to perform the same method.³⁷⁶

The district court held that all claims were patent ineligible under § 101.³⁷⁷ A divided panel of the Federal Circuit reversed, finding all claims patent eligible.³⁷⁸ The court then voted to rehear the case en banc. In a two-sentence per curiam judgment, the en banc court affirmed the district court decision that all claims at issue were patent ineligible under § 101.³⁷⁹ This judgment was followed by six opinions, none of which garnered a majority. The en banc court was evenly divided (5-5) as to the patent eligibility of the system claims.³⁸⁰ Procedurally, the tie vote operated as an affirmance, leaving the district court ruling of patent ineligibility unchanged. And while a majority of seven judges agreed that the method and computer-readable medium claims were patent ineligible, no majority agreed as to the legal rationale for that conclusion.³⁸¹ Chief Judge Rader aptly summarized the discord:

No portion of any opinion issued today other than our Per Curiam Judgment garners a majority. The court is evenly split on the patent eligibility of the system claims. Although a majority of the judges on the court agree that the method claims do not recite patent eligible subject matter, no majority of those judges agrees as to the legal rationale for that conclusion. Accordingly, though much is published today discussing the proper approach to the patent eligibility inquiry, nothing said today beyond our judgment has the weight of precedent.³⁸²

Judge Lourie and Chief Judge Rader authored the primary opinions.³⁸³ Judge Lourie’s proposed framework can be summarized as proceeding along the following steps:

375. *Id.* at 1287–88.

376. *Id.* at 1289.

377. *Id.* at 1275.

378. *Id.* at 1273.

379. *Id.* at 1273 (per curiam).

380. *Id.* at 1292 n.1 (Rader, C.J., concurring in part and dissenting in part).

381. *Id.*

382. *Id.*

383. *Id.* at 1273 (Lourie, J., concurring); *Id.* at 1292 (Rader, C.J., concurring in part and dissenting in part).

First, the court must ask whether the claim literally falls within the scope of § 101—i.e., does the claim literally recite a “process, machine, manufacture, or composition of matter”?³⁸⁴ Applying this step, Judge Lourie found that the claimed method, computer-readable medium, and system claims each fell within the § 101 categories.³⁸⁵

Second, assuming the claim literally falls within § 101, “the analysis turns to the judicial exceptions to subject-matter eligibility.”³⁸⁶ With respect to the “abstract idea” exception, the initial question to ask is, “Does the claim pose any risk of preempting an abstract idea”?³⁸⁷ Judge Lourie found that each of the claims at issue in *CLS Bank* raised such concerns.³⁸⁸

Third, if the claim poses a risk of preempting an “abstract idea,” then the court must unambiguously “identify and define whatever fundamental concept appears wrapped up in the claim.”³⁸⁹ Judge Lourie defines an “abstract idea” as a “disembodied concept . . . a basic building block of human ingenuity, untethered from any real-world application.”³⁹⁰ Judge Lourie identified the abstract idea underlying the claims at issue as “the abstract idea of reducing settlement risk by effecting trades through a third-party intermediary (here, the supervisory institution) empowered to verify that both parties can fulfill their obligations before allowing the exchange—i.e., a form of escrow.”³⁹¹

Finally, the “balance of the claim” is evaluated to “determine whether it contains additional substantive limitations that narrow, confine, or otherwise tie down the claim so that, in practical terms, it does not cover the full abstract idea itself.”³⁹² Judge Lourie equates his requirement for “additional substantive limitations” with the Supreme Court’s “inventive concept test.”³⁹³ However phrased, what is needed is a “product of human ingenuity,” which must be more than a “well-understood, routine, conventional activity previously engaged in by researchers in the field,” “token or trivial limitations,”

384. *Id.* at 1282 (Lourie, J., concurring); accord 35 U.S.C. § 101 (2006).

385. *Id.* at 1285, 1288–89 (Lourie, J., concurring).

386. *Id.* at 1282.

387. *Id.*

388. *Id.* at 1286, 1288–89.

389. *Id.* at 1282.

390. *Id.* at 1286.

391. *Id.*

392. *Id.* at 1282.

393. *Id.*

“bare field-of-use limitations,” or “insignificant post-solution activity.”³⁹⁴ Applying this standard, Judge Lourie found that all claims at issue failed to recite an “inventive concept” beyond the underlying “abstract idea” he had identified.³⁹⁵ In particular, for the system claims, Judge Lourie found that the claimed hardware limitations “provide no significant ‘inventive concept’” and “are instead akin to stating the abstract idea of third-party intermediation and adding the words: ‘apply it’ on a computer.”³⁹⁶

Chief Judge Rader proposed a framework that led to the opposite conclusion on the system claims, which he found to be patent eligible.³⁹⁷ The first few steps of Chief Judge Rader’s framework track Judge Lourie’s framework: Does the claim literally recite a process, machine, manufacture, or composition of matter, and if so, does the claim have “elements of abstractness” that warrant “further examination of its eligibility”?³⁹⁸ Chief Judge Rader offered a different definition for an “abstract idea” itself, which he defined as an idea that “has no reference to material objects or specific examples—*i.e.*, is not concrete.”³⁹⁹ Chief Judge Rader identified the particular “abstract idea” underlying the claims at issue as “the general and theoretical concept of using a neutral intermediary in exchange transactions to reduce risk that one party will not honor the deal, *i.e.*, an escrow arrangement.”⁴⁰⁰

Finally, Chief Judge Rader’s approach asks whether the claim, considered as a whole, includes “*meaningful* limitations restricting it to an application, rather than merely an abstract idea.”⁴⁰¹ Under this inquiry, a claim may be “meaningfully limited” if, for example, “it requires a particular machine implementing a process or a particular transformation of matter,” or if “in addition to the abstract idea, the claim recites added limitations which are essential to the invention.”⁴⁰² For Chief Judge Rader, this is not an “inventiveness” inquiry—“whether a new process, machine, and so on is ‘inventive’

394. *Id.* at 1283 (citations omitted).

395. *Id.* at 1286–87, 1288, 1290–91

396. *Id.* at 1291.

397. *Id.* at 1292 (Rader, C.J., concurring in part and dissenting in part).

398. *Id.* at 1311.

399. *Id.* at 1299.

400. *Id.* at 1311.

401. *Id.* at 1299.

402. *Id.* at 1301.

is not an issue under Section 101.”⁴⁰³ Moreover, in Chief Judge Rader’s view, “Pre-emption is only a subject matter eligibility problem when a claim preempts all practical uses of an abstract idea,” because “it is important to remember that all patents ‘pre-empt’ some future innovation in the sense that they preclude others from commercializing the invention without the patentee’s permission.”⁴⁰⁴

Applying this standard, Chief Judge Rader concluded that the asserted system claims were patent eligible, as the claims recited “meaningful limitations” such as “a computer, a first party device, a data storage unit, and a communications controller.”⁴⁰⁵ He further noted that “a claim embodying [a] *machine itself*, with all its structural and functional limitations, [will] rarely, if ever, be an abstract idea.”⁴⁰⁶

In short, the Federal Circuit was deeply divided on how to analyze (1) whether a claim is impermissibly directed to an “abstract idea,” including how to even define what an “abstract idea” is; (2) whether a claim includes a sufficient “inventive concept” in addition to a patent-ineligible “abstract idea,” and the role of “inventiveness” in the § 101 analysis; and (3) the role of “preemption” in the § 101 analysis. Judge Moore had perhaps the harshest assessment of the court’s en banc handiwork, remarking that “[t]here has never been a case which could do more damage to the patent system than this one.”⁴⁰⁷ More generally, Judge Moore observed: “I am concerned that the current interpretation of § 101, and in particular the abstract idea exception, is causing a free fall in the patent system.”⁴⁰⁸

Needless to say, it would be a massive understatement to observe that in *CLS Bank* the Federal Circuit failed to find meaningful guidance in the Supreme Court’s “guideposts” regarding patent eligibility, including *Benson*, *Flook*, *Diehr*, *Bilski*, and *Mayo*. Indeed, two patent-eligibility cases the Federal Circuit has decided since *CLS Bank* only serve to further highlight the divisions in the court as to the proper approach for analyzing patent eligibility.

403. *Id.* at 1294.

404. *Id.* at 1300.

405. *Id.* at 1307 (emphasis removed).

406. *Id.* at 1305.

407. *Id.* at 1313 n.1 (Moore, J., dissenting in part).

408. *Id.* at 1313.

In *Ultramercial, Inc. v. Hulu, LLC*, the court addressed the patent eligibility of a method for distributing copyrighted content over the Internet, where the user receives the product for free in exchange for viewing an advertisement, and the advertiser pays for the copyrighted content.⁴⁰⁹ The district court had held that the claimed method was patent ineligible and dismissed the patentee's complaint.⁴¹⁰ Applying the framework he proposed in *CLS Bank*, Chief Judge Rader held that the claimed method was patent eligible under § 101, reversing the decision of the district court.⁴¹¹

Chief Judge Rader drew a distinction between claiming an abstract idea itself, which is patent ineligible, and claiming an application of an abstract idea, which is patent eligible.⁴¹² Chief Judge Rader characterized the "abstract idea" underlying the claims as the "idea that advertising can be used as a form of currency."⁴¹³ However, focusing on the specific steps recited in the claims, Chief Judge Rader held that the claims were not directed to the abstract idea itself, but to a specific application of the idea, which involved "an extensive computer interface."⁴¹⁴

Judge Lourie concurred, agreeing that the abstract idea at issue was "us[ing] advertising as an exchange or currency."⁴¹⁵ And like the majority, he found that the claims "require more than just that abstract idea as part of the claimed method."⁴¹⁶ In particular, Judge Lourie found that, "unlike the method claims in *CLS Bank*," the "added limitations in these claims represent significantly more than the underlying abstract idea of using advertising as an exchange or currency and, as a consequence, do not preempt the use of that idea in all fields."⁴¹⁷

Chief Judge Rader and Judge Lourie recently squared off in yet another patent-eligibility case in *Accenture Global Services v. Guidewire Software*.⁴¹⁸ But unlike in *Ultramercial*, they reached

409. *Ultramercial, Inc. v. Hulu, LLC*, 722 F.3d 1335, 1337–38 (Fed. Cir. 2013).

410. *Id.* at 1337.

411. *Id.*

412. *Id.* at 1343.

413. *Id.* at 1349.

414. *Id.* at 1352.

415. *Id.* (Lourie, J., concurring).

416. *Id.*

417. *Id.*

418. *Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336 (Fed. Cir. 2013).

different conclusions regarding the outcome. The claims at issue in *Accenture* were directed to systems and methods for generating tasks to be performed in an insurance organization.⁴¹⁹ The representative system claim included a number of structural limitations, including: an “insurance transaction database” organized in a particular way; a “task library database”; a “client component” with a specified functionality; and a “server component” with an “event processor,” “task engine” and “task assistant” programmed in a particular way.⁴²⁰ The district court had held that the claims were directed to “concepts for organizing data” and ruled that they were patent ineligible under § 101 as abstract ideas.⁴²¹

Judge Lourie disagreed with the district court’s characterization of the underlying “abstract idea” at issue. Judge Lourie instead articulated the abstract idea as “generating tasks [based on] rules . . . to be completed upon the occurrence of an event.”⁴²² Nevertheless, based on this definition of the “abstract idea,” Judge Lourie agreed with the district court that the system claim was not directed to

419. *Id.* at 1337–38.

420. *Id.* at 1338–39. Claim 1 of the patent at issue reads in its entirety as follows:

A system for generating tasks to be performed in an insurance organization, the system comprising:

an insurance transaction database for storing information related to an insurance transaction, the insurance transaction database comprising a claim folder containing the information related to the insurance transaction decomposed into a plurality of levels from the group comprising a policy level, a claim level, a participant level and a line level, wherein the plurality of levels reflects a policy, the information related to the insurance transaction, claimants and an insured person in a structured format;

a task library database for storing rules for determining tasks to be completed upon an occurrence of an event;

a client component in communication with the insurance transaction database configured for providing information relating to the insurance transaction, said client component enabling access by an assigned claim handler to a plurality of tasks that achieve an insurance related goal upon completion; and

a server component in communication with the client component, the transaction database and the task library database, the server component including an event processor, a task engine and a task assistant;

wherein the event processor is triggered by application events associated with a change in the information, and sends an event trigger to the task engine; wherein in response to the event trigger, the task engine identifies rules in the task library database associated with the event and applies the information to the identified rules to determine the tasks to be completed, and populates on a task assistant the determined tasks to be completed, wherein the task assistant transmits the determined tasks to the client component.

Id.

421. *Id.* at 1340.

422. *Id.* at 1344 (alterations in original) (citation omitted).

patent-eligible subject matter, stating that “[t]he limitations of the system claims of the ‘284 patent do not provide sufficient additional features or limit the abstract concept in a meaningful way.”⁴²³ However, he did not explain why one could not “generat[e] tasks based on rules to be completed upon the occurrence of an event” without using the specific “insurance transaction database,” “task library database,” “client component,” and “server component” as claimed.

Judge Lourie also distinguished *Ultramercial*, stating that “[t]he claims in *Ultramercial* contained additional limitations from the abstract idea of using advertising as currency, such as limiting the transaction to an Internet website, offering free access conditioned on viewing a sponsor message, and only applying to a media product.”⁴²⁴ He did not, however, explain why limiting a claim to an “Internet website” should have greater significance, for purposes of a § 101 analysis, than limiting a claim to the insurance field. Nor did he explain why the specific claim limitations he singled out from the claim at issue in *Ultramercial* were more concrete than the claim limitations recited in the system claim at issue in *Accenture*, such as the specific “insurance transaction database,” “task library database,” “client component,” and “server component,” all claimed in a particular way.

Chief Judge Rader dissented, stating the following:

[A]ny claim can be stripped down, simplified, generalized, or paraphrased to remove all of its concrete limitations, until at its core, something that could be characterized as an abstract idea is revealed. A court cannot go hunting for abstractions by ignoring the concrete, palpable, tangible limitations of the invention the patentee actually claims.⁴²⁵

In sum, the deeply conflicted Federal Circuit cases described above—*CLS Bank*,⁴²⁶ *Ultramercial*,⁴²⁷ and *Accenture*⁴²⁸—clearly exemplify the chaos that has been wrought by the Supreme Court’s patent-eligibility jurisprudence. Apparently recognizing this fact, on

423. *Id.* at 1345.

424. *Id.*

425. *Id.* at 1346 (Rader, C.J., dissenting) (quoting *Ultramercial, Inc. v. Hulu, LLC*, 722 F.3d 1335, 1344 (2013)).

426. 717 F.3d 1269 (Fed. Cir. 2013) (en banc).

427. 722 F.3d 1335 (Fed. Cir. 2013).

428. 728 F.3d 1336 (Fed. Cir. 2013).

December 6, 2013, the Supreme Court granted certiorari to hear *CLS Bank*.⁴²⁹ As of the date of this writing, *CLS Bank* remains under consideration by the Court, teeing off an opportunity for yet another landmark § 101 decision.

V. THE DIAGNOSIS: STATUTORY ABANDONMENT

In this part, we assess whether the Supreme Court's body of patent-eligibility jurisprudence is consistent with a sound analysis of the Patent Act under traditional principles of statutory interpretation. We conclude that the Court's exceptions to patent eligibility for "laws of nature, physical phenomena, and abstract ideas" are overbroad, misguided, and largely inconsistent with the statute.⁴³⁰ While we do find statutory support for a subset of the Court's exceptions—namely, "products of nature"—we feel the Court has failed to properly articulate the basis for and scope of this exclusion. Ultimately, we agree with the resonating plea of Chief Judge Rader of the Federal Circuit: "*When all else fails, consult the statute!*"⁴³¹

A. *Lost in the Echo Chamber*

In *Flook*, the Supreme Court acknowledged that the patent-eligibility inquiry "turns entirely on the proper construction of § 101 of the Patent Act."⁴³² It should therefore be axiomatic that the inquiry necessarily "begin[s] with the language of the statute."⁴³³ The Court has further recognized that, "in patent law, as in all statutory construction, '[u]nless otherwise defined, words will be interpreted as taking their ordinary, contemporary, common meaning.'"⁴³⁴ Indeed, the "Court has 'more than once cautioned that [lower] courts should not read into the patent laws limitations and conditions which the legislature has not expressed.'"⁴³⁵

429. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 734 (2013) (granting petition for writ of certiorari).

430. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

431. *CLS Bank*, 717 F.3d at 1335 (Rader, C.J., additional reflections) (emphasis added).

432. *Parker v. Flook*, 437 U.S. 584, 588 (1978).

433. *Diamond v. Diehr*, 450 U.S. 175, 182 (1981); *see also* *Randall v. Loftsgaarden*, 478 U.S. 647, 656 (1986) ("Here, as in other contexts, the starting point in construing a statute is the language of the statute itself.").

434. *Bilski*, 130 S. Ct. at 3226 (quoting *Diehr*, 450 U.S. at 182).

435. *Id.* (citation omitted) (quoting *Diehr*, 450 U.S. at 182) (internal quotation marks omitted).

Given the foregoing principles—which should generally be uncontroversial—it is remarkable how little effort the Supreme Court has actually devoted to analyzing § 101 using traditional tools of statutory interpretation. Quite simply, the Court has not practiced what it preaches. As our review of history has shown,⁴³⁶ the Court has repeatedly looked past substantive analysis of the statute, choosing instead to craft sweeping and vaguely defined exceptions to patent eligibility based on little more than dicta and unsupported statements, repeated and compounded in a judicial echo chamber. For clarity, we succinctly connect the dots below.

In *Le Roy* (1852), a case where patent eligibility was not at issue,⁴³⁷ the Court stated, in dictum and without any statutory analysis, that “[a] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.”⁴³⁸ The Court thereafter expressly relied upon this statement as support for the judicial exceptions in *Funk Bros.*, *Benson*, *Flook*, *Chakrabarty*, *Diehr*, *Bilski*, and *Mayo*.⁴³⁹

In *Morse* (1853), which is best viewed as an enablement case,⁴⁴⁰ the Court found a broad claim invalid because it recited a genus (the use of electromagnetism for printing characters at a distance) while the specification disclosed only a species (the telegraph).⁴⁴¹

436. *See supra* Part III.

437. *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 176–77 (1852) (primary issue on appeal was the propriety of a jury instruction pertaining to novelty; issue of patent eligibility was “not in the case”).

438. *Id.* at 175.

439. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012) (“The Court has long held that [§ 101] contains an important implicit exception. [L]aws of nature, natural phenomena, and abstract ideas are not patentable.” (internal quotation marks omitted) (citing *Le Roy*, 55 U.S. at 175)); *Bilski v. Kappos*, 130 S. Ct. 3218, 3225, 3230 (2010) (noting that the judicial exceptions “have defined the reach of the statute as a matter of statutory stare decisis going back 150 years” (citing *Le Roy*, 55 U.S. (14 How.) at 174)); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981) (quoting *Le Roy*, 55 U.S. (14 How.) at 175); *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (“The laws of nature, physical phenomena, and abstract ideas have been held not patentable.” (citing *Le Roy*, 55 U.S. (14 How.) at 175)); *Parker v. Flook*, 437 U.S. 584, 589 (1978) (quoting *Le Roy*, 55 U.S. (14 How.) at 175); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (quoting *Le Roy*, 55 U.S. (14 How.) at 175); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (“[P]atents cannot issue for the discovery of phenomena of nature.” (citing *Le Roy*, 55 U.S. (14 How.) at 175)).

440. *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 118–21 (1853); *see also supra* note 94 (“We join a number of commentators in making the straightforward yet important observation that *Morse* was decided on enablement grounds.”).

441. *Morse*, 56 U.S. (15 How.) at 120.

However, the Court recast *Morse*'s holding in *Tilghman* (1881), stating, in dictum, that “[t]he eighth claim of Morse’s patent was held to be invalid, because it was regarded by the court as being not for a process, but for a mere principle. . . . that is, a claim to the exclusive use of one of the powers of nature for a particular purpose.”⁴⁴² The Court thereafter expressly relied upon *Morse* and/or *Tilghman* as support for the judicial exceptions in *Benson*, *Flook*, *Chakrabarty*, *Diehr*, *Bilski*, and *Mayo*.⁴⁴³ The Court now interprets *Morse* as standing for the vague proposition that a patent may not “too broadly preempt the use of a natural law.”⁴⁴⁴

In *Rubber-Tip Pencil* (1874), a decision best viewed as an obviousness case,⁴⁴⁵ the Court stated, in dictum, that “[a]n idea of itself is not patentable, but a new device by which it may be made practically useful is.”⁴⁴⁶ The Court thereafter expressly relied upon this unsupported statement in *Benson* (1981) to establish “the longstanding rule that ‘[a]n idea of itself is not patentable,’”⁴⁴⁷ thus forming the “abstract ideas” exception to patent eligibility.⁴⁴⁸

In *Cochrane* (1876), after waiving off patent-eligibility concerns, the Court stated, in dictum, that a “process” is “an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing.”⁴⁴⁹ The Court thereafter

442. *Tilghman v. Proctor*, 102 U.S. 707, 726 (1880) (citing *Morse*, 56 U.S. (15 How.) at 62).

443. *Mayo*, 132 S. Ct. at 1294, 1300–02 (citing *Morse*, 56 U.S. (15 How.) at 112–20); *Bilski*, 130 S. Ct. at 3253 (citing *Morse*, 56 U.S. (15 How.) at 113); *Diehr*, 450 U.S. at 187–88 (citing *Morse*, 56 U.S. at 62); *Chakrabarty*, 447 U.S. at 309 (citing *Morse*, 56 U.S. (15 How.) at 112–21); *Flook*, 437 U.S. at 592 (citing *Morse*, 56 U.S. (15 How.) at 112–21); *id.* at 589 (citing *Tilghman*, 102 U.S. at 728); *Benson*, 409 U.S. at 68–69 (citing *Morse*, 56 U.S. (15 How.) at 111–13); *id.* at 70 (citing *Tilghman*, 102 U.S. at 721, 729).

444. *Mayo*, 132 S. Ct. at 1294 (citing *Morse*, 56 U.S. (15 How.) at 112–20) (emphasis added); *id.* at 1301 (“The Court has repeatedly emphasized . . . a concern that patent law not inhibit further discovery by improperly tying up the future use of laws of nature.” (citing *Morse*, 56 U.S. (15 How.) at 112–20)); *see also Bilski*, 130 S. Ct. at 3253 (citing *Morse*, 56 U.S. (15 How.) at 113) (describing *Morse* as “explaining that Morse’s patent on electromagnetism for writing would preempt a wide swath of technological developments.”).

445. *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874); *see also supra* note 107 and accompanying text (collecting cases classifying *Rubber-Tip Pencil* as an obviousness case).

446. *Rubber-Tip*, 87 U.S. (20 Wall.) at 507.

447. *Benson*, 409 U.S. at 67 (quoting *Rubber-Tip Pencil*, 87 U.S. (20 Wall.) at 507).

448. *See Diehr*, 450 U.S. at 185 (“Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.” (citing *Benson*, 409 U.S. at 67)).

449. *Cochrane v. Deener*, 94 U.S. 780, 788 (1876).

quoted this definition in *Benson* and *Flook*,⁴⁵⁰ and it applied the definition to find a process claim patent eligible in *Diehr*.⁴⁵¹ The Court then clarified in *Bilski* that the so-called “machine-or-transformation test” is a “useful and important clue,” but “is not the sole test” for the patent eligibility of a claimed process.⁴⁵² Finally, the Court further clarified in *Mayo* that satisfying the machine-or-transformation test does not “trump[] the ‘law of nature’ exclusion.”⁴⁵³

In *Mackay Radio* (1939), after finding a claimed radio antenna patent eligible, the Court stated, in dictum and without citation to authority, that “[w]hile a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.”⁴⁵⁴ The Court later cited *Mackay Radio* as support for the judicial exceptions in *Funk Bros.*, *Benson*, *Flook*, *Diehr*, and *Mayo*.⁴⁵⁵

In *Funk Bros.* (1948), the Court expressly held that “patents cannot issue for the discovery of the phenomena of nature” or “laws of nature,” as they are “part of the storehouse of knowledge . . . free to all men and reserved exclusively to none.”⁴⁵⁶ The Court further held that even an “application of [a] newly-discovered natural principle” is not patent eligible unless it includes some “invention”

450. *Benson*, 409 U.S. at 70 (“Transformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.” (quoting *Cochrane*, 94 U.S. at 787–88)); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978) (“An argument can be made . . . that this Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a ‘different state or thing.’” (quoting *Cochrane*, 94 U.S. at 787–88)). In both cases, however, the Court noted that it was “not hold[ing] that no process patent could ever qualify if it did not meet the requirements of our prior precedents.” *Benson*, 409 U.S. at 71; see also *Flook*, 437 U.S. at 588 n.9. (“As in *Benson*, we assume that a valid process patent may issue even if it does not meet one of these qualifications of our earlier precedents.”).

451. *Diehr*, 450 U.S. at 184 (“That respondents’ claims involve the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing cannot be disputed.” (citing *Benson*, 409 U.S. at 70; *Cochrane*, 94 U.S. at 787–88)).

452. *Bilski v. Kappos*, 130 S. Ct. 3218, 3227 (2010).

453. *Mayo Collaborative Servs. v. Prometheus Labs.*, 132 S. Ct. 1289, 1303 (2012) (citing *Bilski*, 130 S. Ct. at 3225).

454. *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939).

455. See *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (citing *Mackay Radio*, 306 U.S. at 94); *Benson*, 409 U.S. at 67 (quoting *Mackay Radio*, 306 U.S. at 94); *Flook*, 437 U.S. at 591 (quoting and analyzing *Mackay Radio*, 306 U.S. at 94); *Diehr*, 450 U.S. at 188 (“We think this statement in *Mackay* takes us a long way toward the correct answer in this case.”) (quoting *Mackay Radio*, 306 U.S. at 94)); *Mayo*, 132 S. Ct. at 1294 (quoting *Mackay Radio*, 306 U.S. at 94).

456. *Funk Bros.*, 333 U.S. at 130.

beyond the natural principle itself, rather than a mere “simple step.”⁴⁵⁷ The Court did not conduct any analysis of the Patent Act in reaching these holdings; rather, it relied upon the Court’s prior unsupported statements in cases such as *Le Roy* and *Mackay Radio*.⁴⁵⁸ The Court thereafter relied upon *Funk Bros.* in at least *Flook* and *Mayo* as support for what became the two-step “inventive concept” test.⁴⁵⁹

In *Benson* (1972), the Court held that “abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.”⁴⁶⁰ The Court further held that a patent claim may not “wholly preempt the [use of a] mathematical formula” or “algorithm.”⁴⁶¹ The Court conducted no analysis of § 101 in reaching these holdings, beyond citing the statutory language in a footnote.⁴⁶² Rather, the Court based its ruling entirely upon unsupported statements from prior cases such as *Le Roy*, *Morse*, *Rubber-Tip Pencil*, *Cochrane*, *Tilghman*, *Mackay Radio*, and *Funk Bros.*⁴⁶³

In *Flook* (1978), the Court superficially acknowledged that the patent-eligibility inquiry “turns entirely on the proper construction of § 101 of the Patent Act.”⁴⁶⁴ However, after merely quoting the statute in a footnote,⁴⁶⁵ the Court held that “[t]he plain language of § 101 does not answer the question.”⁴⁶⁶ Without conducting any statutory analysis, the Court reasoned that the “*holding* [of

457. *Id.* at 132.

458. *Id.* at 130 (citing *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852); *Mackay Radio*, 306 U.S. at 94).

459. See *Flook*, 437 U.S. at 591–92 (quoting *Funk Bros.*, 333 U.S. at 130); *Mayo*, 132 S. Ct. at 1294 (“[The Court’s precedents] insist that a process that focuses upon the use of a natural law [must] also contain other elements or a combination of elements, sometimes referred to as an ‘inventive concept,’ sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself.”); *id.* (quoting *Funk Bros.*, 333 U.S. at 130 (“If there is to be invention from [a discovery of a law of nature], it must come from the application of the law of nature to a new and useful end.”)).

460. *Benson*, 409 U.S. at 67.

461. *Id.* at 71–72.

462. *Id.* at 64 n.2 (quoting 35 U.S.C. §§ 100(b) & 101 (1952)).

463. *Id.* at 67–70 (citing and quoting *Le Roy*, 55 U.S. at 175; *O’Reilly v. Morse*, 56 U.S. 62, 111–13 (1853)); *Mackay Radio*, 30 U.S. at 94; *Funk Bros.*, 333 U.S. at 130; *Tilghman v. Proctor*, 102 U.S. 707, 721 (1880); *Cochrane v. Deener*, 94 U.S. 780, 785 (1876); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498, 507 (1874)).

464. *Flook*, 437 U.S. at 588.

465. *Id.* at 588 n.8 (quoting 35 U.S.C. §§ 100(b) & 101 (1952)).

466. *Id.* at 588.

Benson] . . . forecloses a purely literal reading of § 101,⁴⁶⁷ ignoring that *Benson* never actually analyzed the statute. The Court cast *Benson* as having “[r]eason[ed] that an algorithm, or mathematical formula, is like a law of nature,” applying the “established rule that a law of nature cannot be the subject of a patent.”⁴⁶⁸ As support for the “established rule,” the *Flook* Court cited and quoted prior cases such as *Le Roy*, *Morse*, *Cochrane*, *Tilghman*, *Mackay Radio*, and *Funk Bros.*⁴⁶⁹

In *Chakrabarty* (1980), the Court acknowledged the three judicial exceptions to patent eligibility, stating that “laws of nature, physical phenomena, and abstract ideas have been held not patentable.”⁴⁷⁰ As support for this proposition, the Court cited *Le Roy*, *Morse*, *Funk Bros.*, *Benson*, and *Flook*.⁴⁷¹

In *Diehr* (1981), the Court again stated that “[t]his Court has . . . recognized limits to § 101,” including exclusions for “laws of nature, natural phenomena, and abstract ideas.”⁴⁷² As support, the Court cited *Le Roy*, *Morse*, *Rubber-Tip Pencil*, *Cochrane*, *Mackay Radio*, *Funk Bros.*, *Benson*, *Flook*, and *Chakrabarty*.⁴⁷³

In *Bilski* (2010), the Court reaffirmed that “[t]he Court’s precedents provide three specific exceptions to § 101’s broad patent eligibility principles: ‘laws of nature, physical phenomena, and abstract ideas.’”⁴⁷⁴ The Court relied upon *Le Roy*, *Cochrane*, *Funk Bros.*, *Benson*, *Flook*, *Chakrabarty*, and *Diehr*.⁴⁷⁵ The Court

467. *Id.* at 589 (analyzing *Benson*, 409 U.S. at 67) (emphasis added).

468. *Id.* (citing *Benson*, 409 U.S. at 71–72) (emphasis added).

469. *Id.* at 588–92 (citing and quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939); *Tilghman v. Proctor*, 102 U.S. 728 (1880); *Cochrane v. Deener*, 94 U.S. 780, 787–88 (1876); *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 112–21 (1853); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852)).

470. *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (emphasis added).

471. *Id.* (citing *Le Roy*, 55 U.S. (14 How.) at 175; *Morse*, 56 U.S. (15 How.) at 112–21; *Funk Bros.*, 333 U.S. at 130; *Benson*, 409 U.S. at 67; *Flook*, 437 U.S. at 584).

472. *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

473. *Id.* at 185–88 (quoting *Chakrabarty*, 447 U.S. at 309; *Flook* 437 U.S. at 590; *Benson* 409 U.S. at 71; *Mackay Radio*, 306 U.S. at 94; *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874); *Le Roy*, 55 U.S. (14 How.) at 175) (citing *Flook*, 437 U.S. at 586; *Benson*, 409 U.S. 63; *Funk Bros.*, 333 U.S. 127; *Cochrane*, 94 U.S. at 780; *Morse*, 56 U.S. (15 How.) 62; *Le Roy*, 55 U.S. 156).

474. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Chakrabarty*, 447 U.S. at 309) (emphasis added).

475. *Id.* at 3225–31 (quoting *Diehr*, 450 U.S. at 177, 182, 187, 188, 191–92, 192–93, 195; *Chakrabarty*, 447 U.S. at 308, 309, 315; *Flook*, 437 U.S. at 588, 590, 594; *Benson*, 409 U.S. at 67, 70, 71, 72; *Funk Bros.*, 333 U.S. at 130; *Cochrane*, 94 U.S. at 788) (citing *Diehr*, 450 U.S.

similarly relied solely upon prior case law when reaffirming the three judicial exceptions in *Mayo* (2012)⁴⁷⁶ and *Myriad* (2013).⁴⁷⁷

Thus, our review of history makes it painfully clear that, in more than 160 years of jurisprudence—spanning from *Le Roy* (1852) to the present—the Supreme Court has failed to address a simple and yet fundamental question: Where in the Constitution, the Patent Act, or the relevant legislative history does the Court find support for the “laws of nature, physical phenomena, and abstract ideas” exceptions to patent eligibility?

To the contrary, in *Bilski* (2010), the Court finally threw up its hands and conceded that “these exceptions are *not required by the statutory text*,” thus abandoning all pretense of statutory interpretation.⁴⁷⁸ Instead, the Court chose to hang its hat on the concept that “these exceptions have defined the reach of the statutes as a matter of statutory stare decisis going back 150 years.”⁴⁷⁹

But the doctrine of stare decisis is an extraordinarily weak justification for adhering to the current status quo of patent-eligibility jurisprudence. “Stare decisis is a ‘principle of policy,’ and not ‘an inexorable command.’”⁴⁸⁰ Indeed, “the fact that a decision has proved ‘unworkable’ is a traditional ground for overruling it.”⁴⁸¹ Moreover, “[b]eyond workability, the relevant factors in deciding whether to adhere to the principle of stare decisis include the antiquity of the precedent, the reliance interests at stake, and of

175; *Chakrabarty*, 447 U.S. at 308–09; *Flook*, 437 U.S. 584; *Benson*, 409 U.S. 63; *Le Roy*, 55 U.S. (14 How.) at 174–75).

476. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293–94 (2012) (“The Court has long held that [§ 101] contains an important implicit exception. ‘[L]aws of nature, natural phenomena, and abstract ideas’ are not patentable.” (alteration in original) (quoting *Diehr*, 450 U.S. at 185) (citing *Chakrabarty*, 447 U.S. at 309; *Morse*, 56 U.S. (15 How.) at 112–20; *Le Roy*, 55 U.S. (14 How.) at 175)).

477. *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013) (“We have ‘long held that [§ 101] contains an important implicit exception[.] Laws of nature, natural phenomena, and abstract ideas are not patentable.” (quoting *Mayo*, 132 S. Ct. at 1293)).

478. *Bilski*, 130 S. Ct. at 3225 (emphasis added).

479. *Id.* (citing *Le Roy*, 55 U.S. (14 How.) at 174–75); *see also Le Roy*, 55 U.S. (14 How.) at 174–75 (“[A] principle is not patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.”).

480. *United States v. Int’l Bus. Machines Corp.*, 517 U.S. 843, 856 (1996) (quoting *Helvering v. Hallock*, 309 U.S. 106, 119 (1940); *Payne v. Tennessee*, 501 U.S. 808, 828 (1991)).

481. *Montejo v. Louisiana*, 556 U.S. 778, 792 (2009) (citing *Payne v. Tennessee*, 501 U.S. 808, 827 (1991)).

course whether the decision was well reasoned.”⁴⁸² Here, the factors on balance weigh against a rigid application of stare decisis.

First, as we discussed in Part IV, *supra*, the current morass of case law surrounding the Supreme Court’s judicial exceptions to patent eligibility has thoroughly confounded lower courts, proving wholly unworkable in practice. Further, the Supreme Court has rejected attempts by the Federal Circuit to craft more workable standards such as the “machine-or-transformation test,” offering no alternative guidance other than a cryptic direction to “look[] to the guideposts” in the Court’s vague and inconsistent precedents.⁴⁸³

Second, reliance interests do not justify strict adherence to stare decisis in this instance. Given the unworkability, unpredictability, and inconsistency of the Supreme Court’s precedents, it defies logic to uphold the status quo of patent eligibility under the guise of “protect[ing] the legitimate expectations of those who live under the law.”⁴⁸⁴ Indeed, “a precedent that has proven unworkable may generate minimal reliance because stakeholders are simply unable to predict what results it will yield.”⁴⁸⁵ Moreover, as we discuss below and in Part VI, *infra*, applying the traditional tools of statutory interpretation to § 101 would likely result in an *expansion* of patent-eligible subject matter. Such a change would not frustrate the reliance interests of parties who have invested in research and development in anticipation of obtaining a patent. Likewise, any countervailing reliance on the presumed invalidity of existing patents under § 101 is at best highly speculative given the unworkability and inconsistent application of the judicial exceptions. Further, because a correct and workable statutory interpretation of § 101 should *reduce*

482. *Id.* at 792–93 (citing *Pearson v. Callahan*, 555 U.S. 223 (2009)).

483. *See Bilski*, 130 S. Ct. at 3231; *see also id.* at 3229–30 (“Rather than adopting categorical rules that might have wide-ranging and unforeseen impacts, the Court resolves this case narrowly on the basis of this Court’s decisions in *Benson*, *Flook*, and *Diehr*, which show that petitioners’ claims are not patentable processes because they are attempts to patent abstract ideas.”).

484. *Hubbard v. United States*, 514 U.S. 695, 716 (1995) (Scalia, J., concurring in part and concurring in the judgment).

485. Randy J. Kozel, *Stare Decisis as Judicial Doctrine*, 67 WASH. & LEE L. REV. 411, 424 (2010); *see also* Thomas R. Lee, *Stare Decisis in Economic Perspective: An Economic Analysis of the Supreme Court’s Doctrine of Precedent*, 78 N.C. L. REV. 643, 669–70 (2000) (“[W]hen precedent produces confusion in the form of unpredictable results, the costs from retaining the ‘unworkable’ decision generally may outweigh the uncertainty created by overturning the precedent.”); BENJAMIN N. CARDOZO, *THE NATURE OF THE JUDICIAL PROCESS* 151 (1921) (“There should be greater readiness to abandon an untenable position when the rule to be discarded may not reasonably be supposed to have determined the conduct of the litigants.”).

uncertainty in the doctrine's application, the decision of whether to apply *stare decisis* should not require the typical step of "balanc[ing] the importance of having . . . questions *decided* against the importance of having them *decided right*."⁴⁸⁶

Third, as we have demonstrated, the precedents giving rise to the judicial exceptions to patent eligibility are not even based on a "badly reasoned" statutory interpretation of § 101;⁴⁸⁷ rather, they have been created out of whole cloth based on unsupported and misunderstood dicta, without even the pretense that they represent a reasoned statutory interpretation of § 101.⁴⁸⁸ Further, for the reasons discussed in Parts V.B–F, *infra*, the Court's "precedent[s] demonstrably conflict[] with the statutory or constitutional provision[s] [they] purport[] to interpret," thereby further diminishing the weight that should be placed on any reliance interests.⁴⁸⁹ Indeed, "*stare decisis* cannot possibly be controlling when . . . the decision[s] in question ha[ve] been proved manifestly erroneous."⁴⁹⁰

Finally, while "considerations of *stare decisis* weigh heavily in the area of statutory construction, where Congress is free to change [the] Court's interpretation of its legislation,"⁴⁹¹ the Court has "never applied *stare decisis* mechanically to prohibit overruling [the Court's] earlier decisions determining the meaning of statutes."⁴⁹² "Nor is this a case where [the Court] should 'place on the shoulders of Congress the burden of the Court's own error,'"⁴⁹³ for "[i]t is at best treacherous to find in Congressional silence alone the adoption of a controlling rule of law."⁴⁹⁴ Indeed, because the judicial exceptions have been created out of thin air, rather than based on any

486. *Citizens United v. FEC*, 558 U.S. 310, 378 (2010) (Roberts, C.J., concurring).

487. *Montejo v. Louisiana*, 556 U.S. 778, 800 (2009) (Alito, J., concurring).

488. *See Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (conceding that the judicial exceptions are "not required by the statutory text").

489. Amy Coney Barrett, *Stare Decisis and Due Process*, 74 U. COLO. L. REV. 1011, 1062 (2003).

490. *United States v. Gaudin*, 515 U.S. 506, 521 (1995).

491. *Pearson v. Callahan*, 555 U.S. 223, 233 (2009) (quoting *Ill. Brick Co. v. Illinois*, 431 U.S. 720, 736 (1977)).

492. *Monell v. Dep't of Soc. Servs.*, 436 U.S. 658, 695 (1978).

493. *Id.* (quoting *Girouard v. United States*, 328 U.S. 61, 70 (1946)); *see also Altria Group, Inc. v. Good*, 555 U.S. 70, 108 (2008) (Thomas, J., dissenting) ("When a decision of this Court has failed to properly interpret a statute, we should not 'place on the shoulders of Congress the burden of the Court's own error.'" (quoting *Girouard*, 322 U.S. at 69–70)).

494. *Girouard*, 328 U.S. at 69.

interpretation of specific language in the Patent Act, it is difficult to fathom how Congress might effectively overrule the Court's morass of patent-eligibility jurisprudence without potentially running into unintended consequences. In sum, this is an area where the Court should clean up its own mess.

B. Preemption: The Statutory Scheme

The Court has repeatedly emphasized preemption as a chief policy concern underlying the judicial exceptions excluding "laws of nature, physical phenomena, and abstract ideas" from patent eligibility. The Court first invoked preemption as a rationale for the judicial exceptions in *Benson*, holding that a patent claim may not "wholly pre-empt the [use of a] mathematical formula" or "algorithm."⁴⁹⁵ The Court thereafter discussed preemption as a rationale for the judicial exceptions in *Flook*,⁴⁹⁶ *Diehr*,⁴⁹⁷ *Bilski*,⁴⁹⁸ and *Mayo*,⁴⁹⁹ even when analyzing claims that did not wholly preempt a law of nature, physical phenomena, or abstract idea.⁵⁰⁰

The concept of preemption encompasses two logically distinct issues.⁵⁰¹ First, an overbroad patent claim might be said to preempt *embodiments* within its scope that the patentee did not describe and thus presumably did not invent.⁵⁰² Second, a patent claim might be

495. *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972).

496. *Parker v. Flook*, 437 U.S. 584, 589–90 (1978).

497. *Diamond v. Diehr*, 450 U.S. 175, 187 (1981) ("Their process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of that equation. Rather, they seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process.").

498. *Bilski v. Kappos*, 130 S. Ct. 3218, 3231 (2010) ("Allowing petitioners to patent risk hedging would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.").

499. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012). ("[The Court's precedents] warn us against upholding patents that claim processes that too broadly preempt the use of a natural law." (citing *Benson*, 409 U.S. at 71–72); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112–120 (1853)).

500. *See, e.g., Flook*, 437 U.S. at 589–90 (acknowledging that the patentee did "not seek to 'wholly preempt the mathematical formula,' since there are uses of his formula outside the petrochemical and oil-refining industries," yet finding that the addition of mere "post-solution activity" was insufficient to "transform an unpatentable principle into a patentable process"); *Bilski*, 130 S. Ct. at 3231 (finding that a set of claims directed to hedging in "energy markets" was not patent eligible, even though it did not "pre-empt use of [hedging] in all fields," because merely "limiting an abstract idea to one field of use or adding token postsolution components [does] not make the concept patentable").

501. *See generally* Katherine J. Strandburg, *Much Ado About Preemption*, 50 HOUS. L. REV. 563, 570–86 (2013) (recognizing the two distinct threads of the preemption analysis).

502. *See id.*

said to preempt downstream innovation that requires the *use* of the claimed embodiments.⁵⁰³ Unfortunately, the Supreme Court has often conflated these distinct concepts in its patent-eligibility rulings.⁵⁰⁴ However, at any rate, a close analysis reveals that neither preemption thread provides support for the judicial exceptions to § 101.

The first preemption thread—i.e., the concern that an overbroad patent claim might preempt *embodiments* within its scope that the patentee did not describe and thus presumably did not invent—was the situation presented in *Morse*. In that case, the patent described a single species of invention (i.e., the telegraph), yet broadly claimed a genus (i.e., the use of electromagnetism, by any means, to print characters at a distance).⁵⁰⁵ As the Court explained in finding *Morse*'s overbroad claim invalid, “he claims an exclusive right to use a manner and process *which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent.*”⁵⁰⁶ That is, “he claims *what he has not described* in the manner required by law.”⁵⁰⁷ As we have explained, claim overbreadth of this type is a concern that is relevant to the enablement requirement of § 112.⁵⁰⁸ That is, “[t]o be enabling [under § 112], the specification of a patent must teach those skilled in the art how to make and use the *full scope* of the claimed invention without ‘undue experimentation.’”⁵⁰⁹ As the Federal Circuit has explained:

Enablement serves the dual function in the patent system of ensuring adequate disclosure of the claimed invention and

503. *See id.* at 573; Kevin Emerson Collins, *Bilski and the Ambiguity of “An Unpatentable Abstract Idea”*, 15 LEWIS & CLARK L. REV. 37, 59 (2011) (“The problem in *Benson* is not a problem of an abstract claim that describes too many distinct things/methods not invented by the inventor, . . . but rather a problem of a claim that describes things/methods that were actually invented but that are abstract because they have too many end-uses and are thus insufficiently applied to merit patent protection.”).

504. Strandburg, *supra* note 501, at 570–73.

505. *Morse*, 56 U.S. (15 How.) at 120.

506. *Id.* at 113 (emphasis added).

507. *Id.* at 120 (emphasis added).

508. *See* 35 U.S.C. § 112(a) (2012); *see also* *Wyeth & Cordis Corp. v. Abbott Labs*, 720 F.3d 1380, 1384 (Fed. Cir. 2013) (“Claims are not enabled when, at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation.”); *MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1380 (Fed. Cir. 2012) (quoting *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997); *Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999 (Fed. Cir. 2008)); *supra* notes 93–94 and accompanying text (examining the enablement requirement of § 112(a)).

509. *MagSil*, 687 F.3d at 1380 (emphasis added) (citations omitted).

of preventing claims broader than the disclosed invention. This important doctrine prevents both inadequate disclosure of an invention and overbroad claiming that might otherwise attempt to cover more than was actually invented. Thus, a patentee chooses broad claim language at the peril of losing any claim that cannot be enabled across its full scope of coverage. The scope of the claims must be less than or equal to the scope of the enablement to ensure that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims.⁵¹⁰

“It is a truism that the claims of a patent define the invention that is claimed.”⁵¹¹ As such, while the full scope of a claimed invention must be enabled by a commensurate description in the specification, this § 112 disclosure requirement has no logical relevance to whether the *type* of invention claimed is patent *eligible* under § 101. Indeed, if a claim recites a type of invention which is *not* patent eligible, that conclusion should always hold true, even if the specification *does* enable the full scope of the claim. Conversely, if the specification of a patent fails to enable the full scope of a claim under § 112, it does not follow that the *type* of invention claimed may *never* be patented under § 101. Thus, disclosure issues falling under the first preemption thread should always be analyzed under § 112, separate and distinct from the patent-eligibility analysis under § 101.

Indeed, conflating § 112 with § 101 runs the risk of invalidating *all* patents which claim a particular *type* of invention, merely because a *particular* patent had an inadequate *specification*. Yet, this is effectively what the Court has done by repeatedly citing *Morse*—an enablement case—as support for the judicial exceptions to § 101.⁵¹²

510. *Id.* at 1380–81 (citations omitted) (internal quotation marks omitted).

511. *Regents of Univ. of Cal. v. Dakocytomation Cal., Inc.*, 517 F.3d 1364, 1372 (Fed. Cir. 2008).

512. *See, e.g.*, *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012) (citing *Morse*, 56 U.S. (15 How.) at 112–20) (holding that a patent claim may not “too broadly preempt the use of a natural law”); *id.* at 1301 (expressing “a concern that patent law not inhibit further discovery by improperly tying up the future use of laws of nature”); *Bilski v. Kappos*, 130 S. Ct. 3218, 3253 (2010) (“[E]xplaining that *Morse*’s patent on electromagnetism for writing would preempt a wide swath of technological developments.” (citing *Morse*, 56 U.S. (15 How.) at 113)).

The second preemption thread—i.e., the concern that a patent claim might preempt downstream innovation requiring the *use* of the claimed embodiments—was the concern first expressed in *Benson*. The *Benson* Court described the claimed invention as follows:

They claimed a method for converting binary-coded decimal (BCD) numerals into pure binary numerals. The claims were not limited to any particular art or technology, to any particular apparatus or machinery, *or to any particular end use*. They purported to cover *any use* of the claimed method in a general-purpose digital computer of any type.⁵¹³

. . . .

Here the ‘process’ claim is so abstract and sweeping as to cover *both known and unknown uses* of the BCD to pure binary conversion. The *end use* may (1) vary from the operation of a train to verification of drivers’ licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus.⁵¹⁴

The *Benson* Court was concerned with the potential downstream *uses* of the claimed BCD-to-binary conversion process, holding that, because the process “has no substantial practical *application* except in connection with a digital computer, . . . the patent would wholly pre-empt the [use of the] mathematical formula.”⁵¹⁵ Unlike in *Morse*, there was no suggestion in *Benson* that the disclosure in the patent’s specification was insufficient to enable the full scope of the claims. Nonetheless, the *Benson* Court relied upon *Morse* as support for its preemption analysis, recasting that case as having invoked the second thread of preemption concerns regarding downstream *uses*.⁵¹⁶

In *Mayo*, the Court elaborated as to its reasoning underlying the second preemption thread and its purported relation to § 101, stating:

These statements [from the Court’s precedents regarding preemption] reflect the fact that, even though rewarding with patents those who discover new laws of nature and the like might well encourage their discovery, those laws and

513. *Gottschalk v. Benson*, 409 U.S. 63, 64 (1972) (emphasis added).

514. *Id.* at 68 (emphasis added).

515. *Id.* at 71–72 (emphasis added).

516. *Id.* at 68–69.

principles, considered generally, are “the basic tools of scientific and technological work.” And so there is a danger that the grant of patents that tie up their use will inhibit future innovation premised upon them, a danger that becomes acute when a patented process amounts to no more than an instruction to “apply the natural law,” or otherwise foreclose more future invention than the underlying discovery could reasonably justify.⁵¹⁷

With the foregoing line of reasoning, the Court has apparently decided that certain patents are simply undesirable on policy grounds. In certain cases, the Court is making an arbitrary and subjective determination that the benefits of granting a patent to incentivize innovation are outweighed by the preemptive scope of the exclusive rights granted by the patent. As the *Mayo* Court further explained:

[T]he underlying functional concern here is a *relative one: how much future innovation is foreclosed relative to the contribution of the inventor*. A patent upon a narrow law of nature may not inhibit future research as seriously as would a patent upon Einstein’s law of relativity, but the creative value of the discovery is also considerably smaller. And, as we have previously pointed out, even a narrow law of nature (such as the one before us) can inhibit future research.

In any event, our cases have not distinguished among different laws of nature according to whether or not the principles they embody are sufficiently narrow. And this is understandable. *Courts and judges are not institutionally well suited to making the kinds of judgments needed to distinguish among different laws of nature*. And so the courts have endorsed a *bright-line prohibition* against patenting laws of nature, mathematical formulas and the like, which serves as a somewhat more easily administered proxy for the underlying “building-block” concern.⁵¹⁸

In a surprising twist, the Court has admitted that the judiciary is “not institutionally well suited” to make policy judgments as to the

517. *Mayo*, 132 S. Ct. at 1301 (citations omitted).

518. *Id.* at 1303 (emphasis altered) (citations omitted).

value of certain patents to society.⁵¹⁹ Yet, rather than simply omitting preemption considerations from the § 101 analysis, the Court has paradoxically decided that the solution is “a bright-line prohibition against patenting laws of nature, mathematical formulas and the like.”⁵²⁰ But in drawing a purported “bright-line” in the form of the judicial exceptions to § 101, the Court has ironically made the precise kind of policy judgment it admits the judiciary is ill-equipped to handle. The Court has further ignored the practical reality that, without clear definitions for “abstract ideas,” “laws of nature,” and “physical phenomena,” the *application* of the judicial exceptions is inherently subjective and prone to result-driven policy decisions.

At any rate, in declaring certain types of subject matter patent ineligible based on the Court’s view that patent rights would “foreclose[] more future invention than the underlying discovery could reasonably justify,”⁵²¹ the Court has “usurp[ed] the legislative role,”⁵²² frustrating a detailed statutory scheme specifically designed by Congress to balance (a) the policy goal of incentivizing innovation through the grant of exclusive patent rights, with (b) the preemptive effects that exclusive patent rights have on downstream innovation.

For example, in § 101, Congress chose to limit patent eligibility solely to “new and useful process[es], machine[s], manufacture[s], or composition[s] of matter.”⁵²³ This provision reflects a conscious policy determination by Congress that granting limited patent monopolies to incentivize *these types* of innovations—and no others—is ultimately beneficial to society.

At the same time, Congress enacted numerous provisions specifically designed to moderate the preemptive effects inherent to exclusive patent rights. In § 102, Congress chose to grant patents solely for innovations that are novel,⁵²⁴ reflecting the view that a patent should not capture that which is already in the public domain. Similarly, Congress excluded “obvious” advancements over the prior art from patentability under § 103,⁵²⁵ reflecting the view that some

519. *Id.*

520. *Id.*

521. *Id.* at 1301.

522. *In re Bilski*, 545 F.3d 943, 997 (2008) (Newman, J., dissenting).

523. 35 U.S.C. § 101 (2006).

524. 35 U.S.C. § 102 (2006).

525. 35 U.S.C. § 103 (2006).

innovations are too simplistic or trivial to justify the grant of a patent monopoly. With the written description and enablement requirements of § 112,⁵²⁶ Congress required patentees to disclose their invention to the public as a “*quid pro quo* of the right to exclude,”⁵²⁷ while at the same time limiting claim scope to that which the patentee has actually invented and described.⁵²⁸ And with the definiteness requirement set out in § 112,⁵²⁹ Congress required patentees “to apprise potential infringers of the scope of the claims.”⁵³⁰ Finally, and perhaps most importantly, under § 154, Congress limited the term of a patent to twenty years from the filing date of the earliest application to which the patent claims priority.⁵³¹ In doing so, Congress has made a policy determination that granting exclusive patent rights for up to twenty years is a justifiable price to pay in order to incentivize innovation.

In short, Congress has made a detailed policy determination that, upon balancing the interests, it is ultimately beneficial to society to grant exclusive patent rights (1) for up to twenty years,⁵³² (2) for “new and useful process[es], machine[s], manufacture[s], or composition[s] of matter,”⁵³³ (3) provided that such inventions are novel,⁵³⁴ non-obvious,⁵³⁵ disclosed in a fully enabling written description,⁵³⁶ and claimed with sufficient definiteness.⁵³⁷ Yet, the Court has crafted sweeping judicial exceptions to § 101 based primarily on a policy view that “some categories of invention

526. 35 U.S.C. § 112(a) (2012).

527. *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124, 142 (2001) (quoting *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 484 (1974)).

528. *MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1380–81 (Fed. Cir. 2012); *see also* *Wyeth & Cordis Corp. v. Abbott Labs*, 720 F.3d 1380, 1384 (Fed. Cir. 2013) (“Claims are not enabled when, at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation.”); *supra* notes 93–94 and accompanying text.

529. 35 U.S.C. § 112(b) (2012).

530. *Young v. Lumenis, Inc.*, 492 F.3d 1336, 1345 (Fed. Cir. 2007).

531. 35 U.S.C. § 154(a)(2) (2006) (“Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under section 120, 121, or 365(c), from the date on which the earliest such application was filed.”).

532. 35 U.S.C. § 154(a)(2) (2006).

533. 35 U.S.C. § 101 (2006).

534. 35 U.S.C. § 102 (2006).

535. 35 U.S.C. § 103 (2006).

536. 35 U.S.C. § 112(a) (2012).

537. 35 U.S.C. § 112(b) (2012).

deserve no protection” because they have too many downstream uses.⁵³⁸ In doing so, the Court has upset the balance of this calibrated statutory scheme, substituting the will of the judiciary for that of Congress.

Finally, it is important to note that *all* patents “preempt” downstream innovations that require use of the claimed invention.⁵³⁹ This is the very essence and purpose of exclusive patent rights⁵⁴⁰—that one who improves upon another’s patented invention may still be precluded from practicing the claimed elements of the original invention. “A ‘blocking patent’ is an earlier patent that must be licensed in order to practice a later patent.”⁵⁴¹ Indeed, the “Supreme Court has long acknowledged the ‘well established’ rule that ‘an improver cannot appropriate the basic patent of another and that the improver without a license is an infringer and may be sued as such.’”⁵⁴² Indeed, this principle was even reflected in the Patent Act of 1793, which stated the following:

[A]ny person, who shall have discovered an *improvement* in the principle of any machine, or in the process of any composition of matter, which shall have been patented, and shall have obtained a patent for such improvement, *he shall not be at liberty to make, use or vend the original discovery, nor shall the first inventor be at liberty to use the improvement.*⁵⁴³

Accordingly, for the reasons discussed above, preemption issues have no business being included in the § 101 inquiry regarding patent-eligible subject matter. The first thread of preemption concerns—i.e., that an overbroad patent claim might preempt *embodiments* within its scope that the patentee did not describe and thus presumably did not invent—is appropriately addressed under the “full scope” enablement doctrine of § 112. The second thread of preemption concerns—i.e., that a patent claim may preempt

538. *In re Bilski*, 545 F.3d 943, 1012 (Fed. Cir. 2008) (en banc) (Rader, J., dissenting).

539. See Patent Act of 1793, ch. 11, § 2, 1 Stat. 318 (1793).

540. See *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 229 (1964) (explaining that patents are given to encourage invention by rewarding inventors with the right to exclude others from the use of the invention).

541. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1365 (Fed. Cir. 2010) (quoting *Prima Tek II, L.L.C. v. A-Roo Co.*, 222 F.3d 1372, 1379 (Fed. Cir. 2000)).

542. *Id.* (quoting *Temco Elec. Motor Co. v. Apco Mfg. Co.*, 275 U.S. 319, 328 (1928)).

543. Patent Act of 1793, ch. 11, § 2, 1 Stat. 318 (1793) (emphasis altered).

downstream innovation which requires the *use* of the claimed invention—has already been specifically addressed in a detailed and balanced statutory scheme enacted by Congress.

Perhaps for these reasons, the Supreme Court's most recent § 101 decision in *Myriad* did not mention the concept of preemption. The *Myriad* Court found cDNA patent eligible without conducting any inquiry as to what quantum of downstream biotech research would be preempted by *Myriad*'s patent.⁵⁴⁴ The *Myriad* Court relied heavily on *Chakrabarty* for its holding, which had previously been an outlier with respect to its omission of any preemption analysis.⁵⁴⁵ This was a welcome departure from *Mayo*, decided only a year earlier, in which the Court relied heavily on preemption concerns.⁵⁴⁶

C. Abstraction: Yet Another Statutory Scheme

In *Le Roy* (1852), the Supreme Court stated in dictum that “[a] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.”⁵⁴⁷ In *Rubber-Tip Pencil* (1874), the Court further stated in dictum that “[a]n idea of itself is not patentable.”⁵⁴⁸ In *Benson* (1984), the Court relied upon these statements to hold that “abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.”⁵⁴⁹

But what exactly is an “idea,” a “principle,” or an “abstract intellectual concept”? The *Benson* Court held that a mathematical algorithm for converting BCD numerals to pure binary was a patent-ineligible “idea.”⁵⁵⁰ The Court vaguely defined the term “algorithm” as a “procedure for solving a given type of mathematical problem.”⁵⁵¹ The Court thereafter reaffirmed in *Flook* (1978) and *Diehr* (1981) that algorithms are patent ineligible,⁵⁵² with the Court

544. *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2119 (2013).

545. *Id.* at 2116–17 (analyzing *Diamond v. Chakrabarty*, 447 U.S. 303, 305–10 (1980)).

546. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1301–03 (2012); *see also supra* notes 517–521 and accompanying text (discussing various cases in which the Court addressed patent preemption concerns in its analysis).

547. *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852).

548. *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874).

549. *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (citing *Le Roy*, 55 U.S. (14 How.) at 175; *Rubber-Tip Pencil*, 87 U.S. (20 Wall.) at 507).

550. *Id.* at 71–72 (emphasis added).

551. *Id.* at 65.

552. *Diamond v. Diehr*, 450 U.S. 175, 191 (1981); *Parker v. Flook*, 437 U.S. 584, 585 (1978).

describing the applicable judicial exception as an exclusion of “abstract ideas.”⁵⁵³ However, aside from merely holding that algorithms fall within the judicial exception, the Court in *Benson*, *Flook*, and *Diehr* offered no definition or explanation as to what constitutes an “abstract idea.”

In *Bilski* (2010), despite the fact that the claims at issue recited a series of specific method steps, the Court characterized the claims as broadly reciting the “concept of hedging, or protecting against risk,” which the Court held was “an unpatentable abstract idea.”⁵⁵⁴ The Court did not define what an “abstract idea” is, nor did it explain what types of claim elements may be disregarded in determining whether a claim is impermissibly directed to an “abstract idea.” Rather, the Court merely directed lower courts to “look[] to the guideposts in *Benson*, *Flook*, and *Diehr*.”⁵⁵⁵

So what then is an “abstract idea,” and what is the statutory basis for the corresponding judicial exception to § 101? As discussed at length in Part V.B, *supra*, the “abstract ideas” exception cannot be justified merely by concerns regarding preemption, as Congress has enacted a detailed statutory scheme specifically designed to balance preemption concerns against the goal of incentivizing innovation.

Nor can the exception be justified based on any vague notion that “one may not patent an idea,”⁵⁵⁶ or that “[a]n idea of itself is not patentable.”⁵⁵⁷ These holdings are simply illogical and are in plain conflict with the statute. All inventions are ideas at varying levels of generality. Every patent specification describes the ideas conceived by the patentee. Every patent claim defines the scope of the ideas the patentee seeks to protect. Indeed, conception—the very touchstone of invention under the patent laws—is by definition an “idea”: the “formation in the mind of the inventor, of a definite and permanent *idea* of the complete and operative invention.”⁵⁵⁸ Further, the only way to make an invention something *more* than an idea is to actually reduce it to practice—e.g., an item actually built or a process actually performed. But the Patent Act does not require actual reduction to practice. “It is well settled that an invention may be patented before

553. *Diehr*, 450 U.S. at 185.

554. *Bilski v. Kappos*, 130 S. Ct. 3218, 3231 (2010).

555. *Id.*

556. *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972).

557. *Id.* at 67.

558. *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985).

it is reduced to practice,”⁵⁵⁹ as “constructive reduction to practice occurs when a patent application on the claimed invention is filed.”⁵⁶⁰ Indeed, the Court in *Dolbear* expressly held that Alexander Graham Bell could patent his *idea* for transmitting voices electronically, even though he had not yet reduced his conception to practice:

It is quite true that when Bell applied for his patent he had never transmitted telegraphically spoken words so that they could be distinctly heard and understood at the receiving end of his line, but in his specification he did describe accurately and with admirable clearness his process—that is to say, the exact electrical condition that must be created to accomplish his purpose—and he also described, with sufficient precision to enable one of ordinary skill in such matters to make it, a form of apparatus which, if used in the way pointed out, would produce the required effect, receive the words, and carry them to and deliver them at the appointed place.⁵⁶¹

Setting aside preemption concerns and the nonexistent rule against patenting “ideas,” any justification for the “abstract ideas” exception to § 101 can only lie in the concept of *abstraction* itself. But what exactly are the Court’s concerns when it asks whether a claimed invention is too “abstract” to be patent eligible under § 101?

The exception cannot be justified by mere concerns that a claimed invention is too vague or poorly defined to be patentable. Congress has already specifically addressed such concerns with the claim-definiteness requirement of § 112,⁵⁶² under which a patent claim is invalid if “a person of ordinary skill in the art could not determine the bounds of the claim.”⁵⁶³ Nor can the “abstract ideas” exception be justified by a concern that a patent claim is overbroad and captures embodiments that the patentee did not invent. As we discussed at length in Part V.B, *supra*, such concerns are already addressed by § 112 and the “full scope” enablement doctrine, under

559. *Pfaff v. Wells Elecs. Inc.*, 525 U.S. 55, 61 (1998).

560. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986).

561. *Dolbear v. Am. Bell. Tel. Co.*, 126 U.S. 1, 535 (1888).

562. 35 U.S.C. § 112(b) (2012) (“The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.”).

563. *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008).

which “the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without ‘undue experimentation.’”⁵⁶⁴

The “abstract ideas” exception similarly cannot be justified merely by concerns that the claimed invention is too basic, too simplistic, or too trivial to be patentable. Congress expressly addressed such concerns with the non-obviousness requirement of § 103, under which a patent claim is invalid if the “claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art.”⁵⁶⁵ Indeed, under the Court’s holding in *KSR International Co. v. Teleflex*, a fact finder may invoke “common sense” to find a patent claim invalid for obviousness.⁵⁶⁶

Ultimately, we believe the statutory scheme enacted by Congress already systematically eliminates “abstract ideas” from patentability. Stated differently—if a patent claim (a) recites an invention that is novel⁵⁶⁷ and non-obvious,⁵⁶⁸ (b) has a definite claim scope,⁵⁶⁹ and (c) has a claim scope which is fully enabled by the specification,⁵⁷⁰ then that patent claim *by definition* does not recite an “abstract idea.” The judicial exception to § 101 for “abstract ideas” therefore serves no purpose other than to sow confusion and encourage subjective validity determinations outside the appropriate statutory frameworks regarding novelty, non-obviousness, definiteness, and enablement. Accordingly, we propose that the “abstract ideas” exception to § 101 should be relegated to the dustbin of history.

D. An “Inventive Concept”: Conflating Eligibility with Obviousness

The “inventive concept” test originated in *Funk Bros.* (1948), wherein the Court held that even an “application of [a] newly-discovered natural principle” is not patent eligible unless it includes some “invention” beyond the natural principle itself, rather than a

564. *MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1380 (Fed. Cir. 2012) (emphasis added) (citations omitted).

565. 35 U.S.C. § 103 (2006).

566. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“Rigid preventative rules that deny factfinders recourse to common sense . . . are neither necessary under our case law nor consistent with it.”).

567. 35 U.S.C. § 102 (2006).

568. 35 U.S.C. § 103 (2006).

569. 35 U.S.C. § 112(b) (2012).

570. 35 U.S.C. § 112(a) (2012).

mere “simple step.”⁵⁷¹ The Court later relied upon *Funk Bros.* when expressly applying the “inventive concept” test in *Flook* and *Mayo*.⁵⁷²

The “inventive concept” test for patent eligibility is a two-step inquiry: First, the Court will identify the “laws of nature, physical phenomena, [or] abstract ideas” underlying the claim at issue.⁵⁷³ Second, the Court will analyze the claim’s “other elements” to determine whether they collectively recite an “*inventive concept*” that is “sufficient to ensure that the patent [claim] in practice amounts to significantly more than a patent upon the natural law itself.”⁵⁷⁴ For this analysis, the law of nature, physical phenomenon, or abstract idea the Court identifies as underlying the claim “is treated as though it were a familiar part of the prior art,” effectively excising it from the claim.⁵⁷⁵ The required “inventive concept” will then be found in the claim’s “other steps” or elements only if they recite more than “well-understood, routine, conventional activity previously engaged in by researchers in the field.”⁵⁷⁶ Mere pre- or “‘post-solution activity’ that is purely ‘conventional or obvious’” is insufficient.⁵⁷⁷

In a nutshell, the “inventive concept” test effectively asks whether patent claims are *obvious* in view of their underlying “laws of nature, physical phenomena, [or] abstract ideas,” which are “treated as though [they] were a familiar part of the prior art.”⁵⁷⁸ This

571. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 132 (1948).

572. *Parker v. Flook*, 437 U.S. 584, 591–92 (1978) (quoting *Funk Bros.*, 333 U.S. at 130); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012) (“[The Court’s precedents] insist that a process that focuses upon the use of a natural law [must] also contain other elements or a combination of elements, sometimes referred to as an ‘inventive concept,’ sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself.”); *id.* (“If there is to be invention from [a discovery of a law of nature], it must come from the application of the law of nature to a new and useful end.” (quoting *Funk Bros.*, 333 U.S. at 130)).

573. *Mayo*, 132 S. Ct. at 1293–94.

574. *Id.* at 1294 (emphasis added).

575. *Flook*, 437 U.S. at 591–92; *see also id.* at 592 (“We think this case must also be considered as if the principle or mathematical formula were well known.”); *id.* at 594 (“Respondent’s process is unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because *once that algorithm is assumed to be within the prior art*, the application, considered as a whole, contains no patentable invention.” (emphasis added)).

576. *Mayo*, 132 S. Ct. at 1294.

577. *Id.* at 1299 (quoting *Flook*, 437 U.S. at 590).

578. *Flook*, 437 U.S. at 591–92, 598.

inquiry is fraught with flaws that make it inconsistent with the Patent Act and wholly unworkable in practice.

Importantly, the “inventive concept” test improperly conflates the patent-eligibility inquiry (§ 101) with the distinct issue of whether a patent claim is invalid due to obviousness (§ 103).⁵⁷⁹ Justice Stewart highlighted this concern with his dissent in *Flook*.⁵⁸⁰ The conflation of patent eligibility with obviousness directly conflicts with the statute. For reference, we recite the current versions of §§ 101 and 103 below:

[Section 101.] Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, *subject to the conditions and requirements of this title*.⁵⁸¹

[Section 103.] A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been *obvious before the effective filing date* of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.⁵⁸²

Section 101 plainly does not include any language that would suggest an obviousness inquiry. Rather, it expressly defines the *categories* of subject matter that are *eligible* for patenting, “*subject to the conditions and requirements of this title*.”⁵⁸³ When section 103 was added with the Patent Act of 1952, it was titled: “*Conditions for patentability; non-obvious subject matter*.”⁵⁸⁴ The Senate Committee Report to the 1952 Act confirmed that the non-obviousness requirement of § 103 is one of the “conditions and requirements of this title,” stating the following:

579. Compare 35 U.S.C. § 101 (2012), with 35 U.S.C. § 103 (2012).

580. *Flook*, 437 U.S. at 598, 600 (Stewart, J., dissenting).

581. 35 U.S.C. § 101 (2006) (emphasis added).

582. 35 U.S.C. § 103 (2006) (emphasis added).

583. 35 U.S.C. § 101 (emphasis added).

584. Patent Act of 1952, ch. 950, § 103, 66 Stat. 792, 798 (1952) (emphasis added).

Section 101 sets forth the subject matter that *can be* patented, “subject to the conditions and requirements of this title.” *The conditions [u]nder which a patent may be obtained follow*, and section 102 covers the *conditions* relating to novelty

. . . .
Section 103, for the first time in our statute, provides a *condition* which exists in the law and has existed for more than 100 years, but only by reason of decisions of the courts Section 103 states this *requirement* in the title.⁵⁸⁵

Because § 101 defines the categories of subject matter that “can be” patented “subject to the conditions and requirements” of § 103, it is clear that an invention may fall within the categories of patent-eligible subject matter (§ 101) even if it is ultimately *unpatentable* due to obviousness (§ 103). Any other interpretation would make the phrase “subject to the conditions and requirements of this title” mere statutory “surplusage,”⁵⁸⁶ as this qualifier would be unnecessary if a non-obviousness requirement were already subsumed within § 101. As a corollary, the mere fact that a *particular* invention is obvious under § 103 cannot mean that *all* inventions of the same *type* necessarily fall outside the § 101 categories. Conflating the patent-eligibility and non-obviousness requirements therefore confuses the issues and risks unintended consequences—for example, the blanket invalidation of an entire field of patents under § 101, based on a particular bad patent that could otherwise be disposed of under § 103.

The conflation of patent eligibility with non-obviousness is further inconsistent with the statute due to the element of *time*. The current version of § 103—which became effective on September 16, 2012, as part of the America Invents Act—asks whether an invention would have been obvious “before the [patent’s] effective filing date.”⁵⁸⁷ Similarly, the previous version of § 103 asked whether the invention would have been obvious “at the time the invention was made.”⁵⁸⁸ In contrast, there is no reference to time in § 101; it simply

585. S. REP. NO. 82-1979, at 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2399 (emphasis added).

586. *See, e.g.,* Freeman v. Quicken Loans, Inc., 132 S. Ct. 2034, 2043 (2012).

587. 35 U.S.C. § 103 (2012) (effective Sept. 16, 2012).

588. 35 U.S.C. § 103(a) (2006) (effective Dec. 10, 2004–Sept. 15, 2012).

lists the categories of subject matter that have been, are currently, and always will be patent eligible.⁵⁸⁹ Yet, by conflating the patent-eligibility and non-obviousness inquiries, the Court has effectively imported a time element into § 101 which can be determinative of patent eligibility.

For example, under the “inventive concept” test, a patent claim that would recite patent-eligible subject matter if filed *today* might be held patent ineligible under § 101 if filed *tomorrow*, solely because certain claim elements have in the interim become “well-understood, routine, [or] conventional.”⁵⁹⁰ This might result even if the core discovery is still novel at the later date, since the analysis treats any underlying law of nature, physical phenomenon, or abstract idea “as though it were a familiar part of the prior art.”⁵⁹¹ Under the same logic, even if a claimed invention has been held patent *eligible* under § 101, a later *improvement* upon the same invention might be held patent *ineligible*. This issue may arise, in particular, when (a) the point of novelty of the improvement is viewed as a new or more refined understanding of an underlying law of nature, physical phenomenon, or abstract idea—which will nonetheless be treated as “a familiar part of the prior art,”⁵⁹² and (b) the “other steps” which made the original claim patent eligible have since become “well-understood, routine, [or] conventional” and thus cannot save the improvement from being found patent ineligible.⁵⁹³ Such a result cannot be squared with the plain language of § 101, which expressly mandates that, if an invention is a patent-eligible “process, machine, manufacture, or composition of matter,” then “any new and useful *improvement thereof*” must be patent eligible as well.⁵⁹⁴

In addition to its inconsistency with the statute, the “inventive concept” test is wholly unworkable in practice. The core problem is that the analysis invites subjectivity at its initial step, under which a court must first identify the “laws of nature, physical phenomena, [or] abstract ideas” that are “*underlying*” the patent claim at issue.⁵⁹⁵ This is an inherently subjective exercise, because (a) the Supreme

589. 35 U.S.C. § 101 (2006).

590. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012).

591. *Parker v. Flook*, 437 U.S. 584, 591–92, 594 (1978).

592. *Id.*

593. *Mayo*, 132 S. Ct. at 1294.

594. 35 U.S.C. § 101 (2006) (emphasis added).

595. *Mayo*, 132 S. Ct. at 1293–94 (emphasis added).

Court has not defined what constitutes a law of nature, physical phenomenon, or abstract idea, and (b) the task of articulating the principle *underlying* a patent claim is unbounded by the limitations actually recited *in* the claim. A court is thus free to subjectively articulate the underlying principle at any level of generality it pleases. And because the underlying principle is then “treated as though it were a familiar part of the prior art”⁵⁹⁶—effectively excising it from the claim—this initial subjective characterization of the underlying principal can effectively swallow the entire analysis.

For example, in *Funk Bros.*, when considering a claimed inoculant mixture comprising multiple strains of bacteria that would not inhibit each other’s effects, the Supreme Court characterized the “natural principle” underlying the claim as the “discovery that certain strains of the several species of these bacteria are non-inhibitive and may thus be safely mixed.”⁵⁹⁷ But in characterizing the underlying “natural principle” with such specificity and then treating it as though it were well known, the Court effectively excised the key point of novelty from the claim, leading the Court to declare the claimed invention patent ineligible on the ground that the remaining claim elements failed to recite an inventive concept.⁵⁹⁸ To be sure, the Court *could have* instead characterized the underlying “phenomena of nature” at a higher level of generality, such as “the existence of the individual strains of bacteria in nature.” Such a characterization would not have excised the inventive concept—i.e., that certain strains of bacteria can be mixed without inhibiting each other—and thus might have resulted in the claim being held patent eligible.

As another example, in Judge Lourie’s plurality opinion in *CLS Bank*, he characterized the “abstract idea” underlying the claims as the “idea of reducing settlement risk by effecting trades through a third-party intermediary (here, the supervisory institution) empowered to verify that both parties can fulfill their obligations before allowing the exchange—i.e., a form of escrow.”⁵⁹⁹ Effectively excising these elements from the claims, Judge Lourie found that all

596. *Flook*, 437 U.S. at 591–92, 594.

597. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 132 (1948).

598. *Id.* at 131–32.

599. *CLS Bank Int’l v. Alice Corp. Pty. Ltd.*, 717 F.3d 1269, 1286 (Fed. Cir. 2013) (Lourie, J., concurring).

claims failed to recite an inventive concept and thus were not patent eligible.⁶⁰⁰ But the “abstract idea” at issue could have been defined at a higher level of generality, such as “the idea of reducing settlement risk,” or “the concept of escrow.” Such broader characterizations likely would have significantly changed the analysis and may have instead resulted in a finding of patent eligibility.

Indeed, both Judge Lourie and Chief Judge Rader took such an approach in *Ultramercial*, broadly characterizing the underlying “abstract idea” as the “idea that advertising can be used as a form of currency.”⁶⁰¹ Unlike in *CLS Bank*, this more generalized articulation of the “abstract idea” left enough specific elements in the claims for the court to find that they recited patent-eligible subject matter.⁶⁰² In short, the result of the “inventive concept” analysis is significantly impacted—and in many cases dominated—by the initial subjective determination as to what claim limitations are subsumed within the articulated law of nature, physical phenomenon, or abstract idea.

Finally, the “inventive concept” test’s treatment of all laws of nature, physical phenomena, and abstract ideas “as though [they are] a familiar part of the prior art” is fundamentally flawed.⁶⁰³ While we do acknowledge in Part VI.B, *infra*, that a limited variation of this rule may be appropriate in certain circumstances—e.g., for *products of nature* in an *obviousness* analysis under § 103—the Court’s current use of the rule in the § 101 analysis is dangerously overbroad.

First, there can be no logical justification for treating all “abstract ideas” as though they are well known in the art. One may certainly come up with an idea that is novel and non-obvious, yet which can be viewed as too “abstract” for patenting. But if that idea is then refined to a concrete application recited in a patent claim, there is no logical reason the initial “abstract” idea should suddenly lose its status as a point of novelty or as the patentee’s conception. Such a rule “could eviscerate patent law,”⁶⁰⁴ because “any claim can be stripped down, simplified, generalized, or paraphrased to remove all of its concrete limitations, until at its core, something that could

600. *Id.* at 1292.

601. *Ultramercial, Inc. v. Hulu, LLC*, 722 F.3d 1335, 1349 (Fed. Cir. 2013); *id.* at 1355 (Lourie, J., concurring).

602. *Id.* at 1354 (majority opinion); *id.* at 1355 (Lourie, J., concurring).

603. *Parker v. Flook*, 437 U.S. 584, 591–92, 594 (1978).

604. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012).

be characterized as an abstract idea is revealed.”⁶⁰⁵ The “inventive concept” test thus allows a court to excise and ignore a chunk of each patent claim at the onset of every § 101 analysis. For example, Alexander Graham Bell’s patent in *Dolbear*⁶⁰⁶ could have been characterized as embodying the “abstract idea” of transmitting sounds at a distance by varying the intensity of electricity to mimic sound vibrations. Luckily for Bell, the “inventive concept” test did not yet exist at that time, because this “abstract idea”—Bell’s key point of novelty—might have been treated as well known and excised from his claim, potentially rendering the claim patent ineligible.

Second, treating as well known everything that can be characterized as a “law of nature” or a “natural principle” directly conflicts with the fact that “discoveries” constitute patent-eligible subject matter. Moreover, as with abstract ideas, this rule “would, if carried to its extreme, make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.”⁶⁰⁷ We address these issues at length over the next two sections.

E. Patent-Eligible Subject Matter Includes “Discoveries”

The Court has repeatedly held that the mere *discovery* of “a scientific truth, or the mathematical expression of it, is not [a] patentable *invention*.”⁶⁰⁸ Indeed, a distinction between invention and mere discovery appears to have factored heavily into the “inventive concept” framework the Court has applied in many § 101 cases.

For example, in *Funk Bros.*, when considering a claimed inoculant mixture comprising multiple strains of bacteria that would not inhibit each other’s effects, the Court stated the following:

[The patentee] does not create [the] state of inhibition or of non-inhibition in the bacteria. Their qualities are the work of nature. Those qualities are of course not patentable. *For patents cannot issue for the discovery of phenomena of nature.* The qualities of these bacteria, like the heat of the

605. *Ulramercial*, 722 F.3d at 1344.

606. *Dolbear v. Am. Bell. Tel. Co.*, 126 U.S. 1 (1888).

607. *Diamond v. Diehr*, 450 U.S. 175, 189 n.12 (1981).

608. *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939) (emphasis added).

sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. *He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes.* If there is to be *invention* from such a *discovery*, it must come from the application of the law of nature to a new and useful end.⁶⁰⁹

The Court held that the principle underlying the claimed inoculant mixture—i.e., that certain strains of bacteria were mutually non-inhibiting—was “no more than the *discovery* of some of the handiwork of nature and hence [was] not patentable.”⁶¹⁰ “[H]owever ingenious the *discovery* of that natural principle,” the Court reasoned, the mere “aggregation of species [of bacteria into a single mixture] fell short of *invention* within the meaning of the patent statutes.”⁶¹¹

The Court has similarly “held that the *discovery* of a novel and useful mathematical formula may not be patented.”⁶¹² For example, when the *Flook* Court considered a claimed method of updating alarm limits using a mathematical formula, the Court “assume[d] that [the] respondent’s formula [was] novel and useful and that he discovered it.”⁶¹³ However, the Court went on to hold that “the *discovery* of such a phenomenon cannot support a patent unless there is some other *inventive concept* in its application.”⁶¹⁴ The Court further reasoned that, because a mathematical formula is itself unpatentable, “it is treated as though it were a familiar part of the prior art.”⁶¹⁵ The *Flook* Court ultimately held that, “once [the] algorithm is assumed to be within the prior art,” the claimed method of updating alarm limits “contains no patentable *invention*.”⁶¹⁶

Likewise, in *Mayo*, the Court considered a claimed method of determining an optimal drug dosage based on metabolite levels in a

609. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (emphases added).

610. *Id.* at 131 (emphasis added).

611. *Id.* (emphasis added).

612. *Parker v. Flook*, 437 U.S. 584, 591–92, 585 (1978) (emphasis added) (citing *Gottschalk v. Benson*, 409 U.S. 63 (1972)).

613. *Id.* at 588.

614. *Id.* at 594 (emphasis added).

615. *Id.* at 591–92 (quoting *Benson*, 409 U.S. at 67); *id.* at 594.

616. *Id.* at 594 (emphasis added).

patient's blood.⁶¹⁷ The Court characterized the "law of nature" underlying the claim as "natural laws describing the relationships between the concentration in the blood of certain [drug] metabolites and the likelihood that the drug dosage will be ineffective or induce harmful side-effects."⁶¹⁸ The Court reasoned that the discovery of this metabolite-to-drug-dosage correlation was not patent eligible, as it was merely "a consequence of the ways in which [the drugs] are metabolized by the body—entirely natural processes."⁶¹⁹ "If there is to be *invention* from [a *discovery* of a law of nature]," the Court reasoned, "it must come from the application of the law of nature to a new and useful end."⁶²⁰ Setting aside the discovery of the natural correlation, the Court found that the remaining steps were nothing but "well-understood, routine, conventional activity" which included no "inventive concept," rendering the claim patent ineligible.⁶²¹

Thus, in the three examples discussed above, the Court held that the mere "discovery" of (a) the fact that certain bacteria strains were mutually non-inhibiting,⁶²² (b) a mathematical formula for updating alarm limits,⁶²³ and (c) a correlation between metabolite levels and optimal drug dosage,⁶²⁴ all did not constitute patentable "invention." What the Court failed to explain, however, is how these holdings overcome the plain language of the Constitution and the Patent Act.

As we have discussed, the Intellectual Property Clause of the U.S. Constitution authorizes Congress: "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and *Inventors* the exclusive Right to their respective Writings and *Discoveries*."⁶²⁵

By its plain language, the Intellectual Property Clause clearly contemplates that "Inventors" include those who make

617. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct 1289, 1294–95 (2012).

618. *Id.* at 1294; *see also id.* at 1296 ("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.").

619. *Id.* at 1297.

620. *Id.* at 1294 (alteration in original) (emphasis added) (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)).

621. *Id.* at 1298.

622. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).

623. *Parker v. Flook*, 437 U.S. 584, 588 (1978).

624. *Mayo*, 132 S. Ct. at 1294–95.

625. U.S. CONST. art. I, § 8, cl. 8 (emphasis added).

“Discoveries,” and it expressly authorizes Congress to grant “exclusive Right[s]” for such “Discoveries.”⁶²⁶

Indeed, equating inventorship with discovery was consistent with the commonly understood meaning of these terms in 1787, at the time of the Constitutional Convention. For example, the Dictionary of the English Language, in versions published in both 1768 and 1792, provided the following definitions:

To DISCOVER. . . . 1. To show; to disclose; to bring to light. 2. To make known. 3. To find out; to espy.

. . . .

DISCOVERY. . . . 1. The act of finding any thing hidden. 2. The act of revealing or disclosing a secret.

. . . .

To INVENT. . . . 1. To *discover*; to find out; to excogitate.

. . . .

INVENTION. . . . 1. Fiction. 2. *Discovery*. 3. Excogitation; act of producing something new.

. . . .

INVENTOR. . . . 1. A finder out of something new.⁶²⁷

Moreover, as we discussed in Part II, *supra*,⁶²⁸ the Committee of Eleven considered proposals from James Madison and Charles Pinckney when drafting the Intellectual Property Clause. Pinckney proposed to “grant *patents* for useful *inventions*,” while Madison proposed protections for “useful knowledge and *discoveries*.”⁶²⁹ The Committee of Eleven apparently merged the two proposals, authorizing Congress to grant “*Inventors* the exclusive Right to their . . . *Discoveries*.”⁶³⁰ The inclusion of the word “Discoveries” in the Intellectual Property Clause was thus clearly no accident.

Consistent with the spirit and scope of congressional authority granted by the Intellectual Property Clause, section 101 of the Patent Act defines the categories of patent-eligible subject matter as

626. *Id.*

627. SAMUEL JOHNSON, DICTIONARY OF THE ENGLISH LANGUAGE (3d ed. 1768) (emphasis added) (citations omitted). *See also* SAMUEL JOHNSON, DICTIONARY OF THE ENGLISH LANGUAGE (10th ed. 1792) (substantially the same definitions).

628. *See supra* notes 15–24 and accompanying text.

629. THE RECORDS OF THE FEDERAL CONVENTION OF 1787, *supra* note 14, at 321–22, 324–25 (emphases added); *see supra* notes 15–24 and accompanying text.

630. *Id.* at 505 (emphasis added).

follows: “Whoever invents *or discovers* any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”⁶³¹

This language—“whoever invents *or discovers*”—is clear and unambiguous. Moreover, consistent with the Intellectual Property Clause, the Patent Act even equates inventorship with discovery in an express definition, stating: “When used in this title unless the context otherwise indicates—(a) The term “invention” means invention *or discovery*.”⁶³²

Finally, it should be noted that the current version of the Patent Act cited above is not an aberration, as the statute has expressly made inventions *and discoveries* patent eligible from the very beginning, dating all the way back to the Patent Act of 1790.⁶³³

This brings us back to the Supreme Court’s holdings. Despite the clear statutory and constitutional support for the patent eligibility of “discoveries” that fall within the § 101 categories, the Court has held that “patents cannot issue for the *discovery* of phenomena of nature” or “laws of nature,” as these are “free to all men and reserved exclusively to none.”⁶³⁴ In the Court’s view, “however ingenious the *discovery* of [a] natural principle may have been,” it falls “short of *invention* within the meaning of the patent statutes.”⁶³⁵ The Court

631. 35 U.S.C. § 101 (2012) (emphasis added).

632. 35 U.S.C. § 100(a) (2012) (emphasis added). This definition was added “to avoid repetition of the phrase ‘invention or discovery’ and its derivatives throughout the revised title.” See S. Rep. No. 82-1979, at 5 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2409.

633. See, e.g., Patent Act of 1952, ch. 950, § 101, 66 Stat. 792 (1952) (codified at 35 U.S.C. § 101) (“Whoever invents *or discovers* any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefor . . .” (emphasis added)); Patent Act of 1930, ch. 312, § 4886, 46 Stat. 375 (1930) (“Any person who has invented *or discovered* any new and useful art, machine, manufacture, or composition of matter . . . may . . . obtain a patent therefor.” (emphasis added)); Patent Act of 1870, ch. 230, § 24, 16 Stat. 198–217 (1870) (“any person who has invented *or discovered* any new and useful art, machine, manufacture, or composition of matter . . . may obtain a patent therefor.” (emphasis added)); Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836) (“any person or persons having *discovered* or invented any new and useful art, machine, manufacture, or composition of matter” may seek a patent therefor (emphasis added)); Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793) (authorizing the “Secretary of State, to cause letters patent to be made out . . . giving a short description of the said invention *or discovery*, and thereupon granting to such petitioner” (emphasis added)); Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (anyone who has “invented *or discovered* any useful art, manufacture, engine, machine, or device, or any improvement therein” may seek a patent therefor (emphasis added)).

634. Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948) (emphasis added).

635. *Id.* at 131 (emphasis added).

requires patent claims to recite elements that embody an “inventive concept,” disregarding the discovery of any natural principle.⁶³⁶ For all the reasons discussed above, such holdings are clearly erroneous, as they are in direct conflict with the plain language of both the Constitution and the Patent Act. This illustrates yet another reason why the judicial exceptions to § 101 for “laws of nature, physical phenomena, and abstract ideas” are fundamentally flawed.⁶³⁷

But what then are the implications of discoveries being patent eligible? If one “discovers” a chemical process naturally occurring in a swamp, or a plant growing in the jungle, do these discoveries respectively constitute a patent-eligible “process” and “composition of matter” under § 101? The answer is undoubtedly no. And the reason, once again, is firmly grounded in statute. To obtain a patent, one must invent or discover something “new.”⁶³⁸

F. Patent-Eligible Subject Matter Must Be “New”

We turn now to the most overlooked word in § 101—“new.” Section 101 states: “Whoever invents or discovers any *new* and useful process, machine, manufacture, or composition of matter, or any *new* and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”⁶³⁹

The word “new” in § 101 provides concrete statutory support for a subset—though certainly not the entire scope—of the judicial exceptions excluding “laws of nature” and “physical phenomena” from patent eligibility.⁶⁴⁰ The Supreme Court has flirted with this prospect, vaguely suggesting that the judicial exceptions “are consistent with the notion that a patentable process must be ‘new and useful.’”⁶⁴¹ However, the Court has not expressly analyzed or explained how the word “new” informs the § 101 inquiry.

The first Patent Act, enacted in 1790, did not include the word “new” in the definition of patent-eligible subject matter. Rather, the

636. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1294 (2012) (citing *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

637. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

638. 35 U.S.C. § 101 (2012) (emphasis added).

639. *Id.* (emphasis added).

640. *Bilski*, 130 S. Ct. at 3225 (quoting *Chakrabarty*, 447 U.S. at 309).

641. *Id.*

Act defined patent-eligible subject matter in section 1 as including “any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used.”⁶⁴²

In the Patent Act of 1793, drafted by Thomas Jefferson,⁶⁴³ the definition of patent-eligible subject matter was modified to include “any *new* and useful art, machine, manufacture or *composition of matter*, or any *new* or useful improvement [therein], not known or used before.”⁶⁴⁴

The foregoing changes were significant for several reasons. First, in the 1790 Act, the definition of patent-eligible subject matter and the novelty requirement were both included in the same sentence of section 1, with novelty being reflected in the phrase “not before known or used.”⁶⁴⁵ Similar language regarding novelty was carried over into section 1 of the 1793 Act, in the phrase “not known or used before.”⁶⁴⁶ Yet, even though section 1 already contained express language pertaining to novelty, the 1793 revisions added the word “new” to section 1 in two places.⁶⁴⁷ Moreover, the word “new” was added as a qualifier immediately preceding the listed categories of patent-eligible subject matter, whereas the words “not known or used before” were retained later in the sentence.⁶⁴⁸

The foregoing amendment in the 1793 Act strongly suggests that Congress (and Jefferson) intended the word “new” to have a different meaning in the context of patent-eligible subject matter, distinct from the concept of novelty that was already reflected in the phrase “not known or used before.”⁶⁴⁹ Otherwise, adding the word “new”—twice, in the same sentence as “not known or used before”—would have been mere “surplusage.”⁶⁵⁰ We posit that the term “new” was

642. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793).

643. Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793); see *Chakrabarty*, 447 U.S. at 308–09 (referencing Thomas Jefferson as the author of the 1793 Act).

644. Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793) (emphases added).

645. Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793). It was not until the Patent Act of 1952 that the categories of patent-eligible subject matter and the novelty requirement were separated into section 101 and section 102, respectively. See Patent Act of 1952, ch. 950, §§ 101–02, 66 Stat. 792 (1952) (codified at 35 U.S.C. § 101).

646. Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793).

647. See *supra* notes 642–644 and accompanying text.

648. See Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793).

649. *Id.*; see also 35 U.S.C. § 102 (2012) (providing the modern novelty requirement).

650. See *Freeman v. Quicken Loans, Inc.*, 132 S. Ct. 2034, 2043 (2012) (noting that “the canon against surplusage . . . favors that [statutory] interpretation which *avoids* surplusage”); *Duncan v. Walker*, 533 U.S. 167, 174 (2001) (explaining that the Court is “reluctan[t] to treat

added to the definition of patent-eligible subject matter specifically to clarify that something must be “new” *to the world* to be patent eligible, even if it was “not known or used before.”

Our interpretation is supported by the fact that the word “new” was added to the statute at the same time as the “composition of matter” category of patent-eligible subject matter.⁶⁵¹ At the time of the 1793 Act, the dictionary definition of “MATTER” included: “2. Materials; that of which anything is composed.”; and “9. Thing; object; that which has some particular relation.”⁶⁵² The dictionary definition of “COMPOSITION” further included: “3. A mass formed by mingling different ingredients.”⁶⁵³ Under these broad definitions, any mass, object, or thing composed of two or more materials or substances could arguably be viewed as a “composition of matter.”⁶⁵⁴ This would have been problematic, because an applicant might discover a “composition of matter” in nature—for example, any naturally occurring organism or thing composed of multiple elements—which was “not known or used before.” However, such a “composition of matter” would not be “new” *to the world*, as it existed in nature prior to its discovery. This suggests that the word “new” was added to the Patent Act specifically to clarify that naturally existing compositions of matter, as well as naturally occurring processes—i.e., “product[s] of nature”⁶⁵⁵ that are not “new” to the world—do not constitute patent-eligible subject matter.

Indeed, when Congress re-codified the patent laws in 1952 and split the patent eligibility and novelty requirements into § 101 and § 102 respectively, the word “new” was retained in § 101 as a

statutory terms as surplusage’ in any setting” and is “especially unwilling to do so when the term occupies so pivotal a place in the statutory scheme” (quoting *Babbitt v. Sweet Home Chapter Cmty. for a Great Or.*, 515 U.S. 687, 698 (1995)).

651. Compare Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793), with Patent Act of 1793, ch. 11, § 1, 1 Stat. 318 (1793).

652. SAMUEL JOHNSON, *DICTIONARY OF THE ENGLISH LANGUAGE* (8th ed. 1792).

653. *Id.*

654. Later definitions of “composition of matter” have been similar. See, e.g., *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (noting that “‘composition of matter’ has been construed consistent with its common usage to include ‘all compositions of two or more substances and . . . all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids’” (quoting *Shell Dev. Co. v. Watson*, 149 F. Supp. 279, 280 (D.C. 1957))).

655. *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2111 (2013).

qualifier to the statutory categories.⁶⁵⁶ This is consistent with our view that patent-eligible subject matter must be “new” to the world under § 101, even if the claimed subject matter otherwise satisfies the novelty requirement of § 102.⁶⁵⁷

How then does this relate to the judicial exceptions to § 101 for “laws of nature” and “physical phenomena”?⁶⁵⁸ As an initial matter, the word “new” appears to provide limited statutory support for a subset of these exceptions. For example, compositions of matter that exist in nature are “physical phenomena,” often referred to by the Supreme Court as “product[s] of nature.”⁶⁵⁹ Similarly, naturally occurring processes can be viewed as manifestations of the “laws of nature.” Because neither are “new” to the world, they cannot constitute patent-eligible subject matter under § 101.

However, the judicial exceptions for “laws of nature” and “physical phenomena” are too vague and too broad to be completely justified by the “new” requirement of § 101. Even subject matter that is “new” to the world might still fail to pass muster under the judicial exceptions. Consider, for example, the following hypothetical:

After spending billions of dollars on medical research, Cancer Research Corp. discovers that all forms of cancer that afflict humans are miraculously cured within 24 hours when 250–500mg of lunar dust is introduced into the bloodstream. Cancer Research Corp. seeks a patent claiming the following: “A method of curing cancer, comprising the steps of: (1) dissolving 250mg to 500mg of lunar dust in a liquid solution; (2) injecting said liquid solution containing said lunar dust into the bloodstream of a cancer patient; and (3) curing the patient of cancer.”

656. See Patent Act of 1952, Pub L. No 82-593, §§ 101, 102, 66 Stat. 792 (1952) (codified at 35 U.S.C. §§ 100(b) & 101 (2012)).

657. Of course, this is not to say that the word “new” in § 101 never overlaps with the novelty requirement of § 102. Indeed, the Committee Report to the 1952 Act recognized as much. See S. Rep. No. 82-1979, at 5 (1952), reprinted in 1952 U.S.C.C.A.N. 2394, 2399 (“Section 102, in general, may be said to describe the statutory novelty required for patentability, and includes, in effect, an amplification and definition of ‘new’ in section 101.”). We merely posit that the two requirements are slightly different in scope. Namely, something that is novel under § 102 might still not be “new” to the world under § 101—for example, when the claimed subject matter is a “composition of matter” that exists in nature, or a “process” that occurs in nature, but was previously unknown to those of skill in the art.

658. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Chakrabarty*, 447 U.S. at 309).

659. *Myriad*, 133 S. Ct. at 2111.

Curing cancer by injecting dissolved lunar dust into a human's bloodstream would clearly be a "process" that is "new" to the world, as there is no indication that such a process can be observed occurring in nature. Thus, under our interpretation of the statute, the claimed "process" would be patent eligible under § 101.

In contrast, the patent eligibility of the method of curing cancer is less certain under the judicial exceptions to § 101, particularly under the two-step "inventive concept" test applied in *Mayo*. First, the Court would identify the "law of nature" underlying the claim, which it might characterize as "the natural law that 250–500mg of lunar dust in the bloodstream reacts within the human body to cure cancer."⁶⁶⁰ Second, the Court would analyze the claim's "other elements" to look for an "inventive concept" that "amounts to significantly more than a patent upon the natural law itself."⁶⁶¹ The Court might view the steps of dissolving a powder and injecting a solution into the bloodstream as nothing but "well-understood, routine, conventional activity previously engaged in by researchers in the field."⁶⁶² Because "[a]nyone who wants to make use of the[] law[]" that lunar dust cures cancer would necessarily have to take these routine steps, the Court may find that the claim recites "nothing significantly more than an instruction to doctors to apply the applicable law[] when treating their patients."⁶⁶³ It accordingly appears that a straightforward application of *Mayo* might result in the hypothetical method of curing cancer being held patent ineligible.⁶⁶⁴

Thus, even though the hypothetical method of curing cancer would be a "process" that is "new" to the world—and would

660. In *Mayo*, when considering a claimed method of determining optimal drug dosage based on metabolite levels in a patient's blood, the Court characterized the "law of nature" underlying the claim as "natural laws describing the relationships between the concentration in the blood of certain [drug] metabolites and the likelihood that the drug dosage will be ineffective or induce harmful side-effects." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294–96 (2012).

661. *Id.* at 1294 (emphasis added) (citing *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

662. *Id.* at 1294.

663. *Id.* at 1298.

664. To be sure, the *Mayo* Court did suggest that *diagnostic* methods may somehow be distinguishable from *treatment* methods, stating: "Unlike, say, a typical patent on a new drug or a new way of using an existing drug, the patent claims do not confine their reach to particular applications of [natural] laws." *Id.* at 1302. However, the Court offered no explanation or reasoning to support any such distinction. *Id.* Thus, it is difficult to fathom how the hypothetical method of treating cancer described herein can be anything but patent ineligible under *Mayo*, unless the framework and reasoning applied in *Mayo* is subsequently modified by the Court.

therefore be patent eligible under our interpretation of § 101—there is a good chance it might be found patent ineligible under the Supreme Court’s exception for “laws of nature” when applied using the prevailing “inventive concept” test. The foregoing hypothetical clearly exemplifies how the judicial exceptions—and in particular the “inventive concept” framework—are illogical and inconsistent with the plain language of the statute. As described in Part V.E, *supra*, the Constitution and the Patent Act both clearly provide for the patentability of “discoveries.” The statute could not be more clear on this point—whoever “discovers any *new* and useful *process*” has satisfied the requirements of § 101.⁶⁶⁵ Indeed, a new process of curing cancer by injecting lunar dust into the bloodstream would certainly be an earth-shattering discovery—precisely the kind of innovation the patent system is presumably intended to incentivize.

As we have shown in this Part,⁶⁶⁶ the judicial exceptions to § 101 for “laws of nature, physical phenomena, and abstract ideas” are overbroad, misguided, and largely inconsistent with the statute.⁶⁶⁷ These exceptions clearly are “not required by the statutory text.”⁶⁶⁸ Nor are they justified by “preemption” concerns, as Congress has enacted a detailed statutory scheme specifically designed to balance preemption concerns against the goal of incentivizing innovation.⁶⁶⁹ Likewise, the “abstract ideas” exception is itself an abstraction in view of the statutory scheme, as claims which satisfy all of the conditions of patentability are by definition not abstract.⁶⁷⁰ The “inventive concept” test improperly conflates § 101 with § 103, is wholly unworkable in practice, and ignores the fact that “discoveries” can be patent eligible.⁶⁷¹ Finally, although the word “new” in § 101 provides limited statutory support for a subset of the “laws of nature” and “physical phenomena” exceptions, these frameworks—in conjunction with the “inventive concept” test—are dangerously overbroad. As Justice Frankfurter aptly noted, “Everything that happens may be deemed ‘the work of nature,’ and

665. 35 U.S.C. § 101 (2012) (emphases added).

666. *See supra* Part V.

667. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).

668. *Id.*; *see also supra* Part V.A.

669. *See supra* Part V.B.

670. *See supra* Part V.C.

671. *See supra* Parts V.D–E.

any patentable composite exemplifies in its properties ‘the laws of nature.’”⁶⁷² As such, the inventive-concept test “would, if carried to its extreme, make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.”⁶⁷³

Accordingly, for all the foregoing reasons, we propose that the judicial exceptions to § 101 for “laws of nature, physical phenomena, and abstract ideas,” as well as the “inventive concept” test, should be abandoned entirely. In their stead, we propose asking a simple and straightforward question that is grounded firmly in the statutory text: *Is the claimed subject matter “new” to the world?*

VI. THE CURE: HITTING THE “RESET” BUTTON

In Parts I–V, we have provided an in-depth analysis of § 101, including its constitutional basis and legislative history, and we have surveyed more than 160 years of Supreme Court patent-eligibility jurisprudence, leading up to the Court’s recent decision in *Myriad*.⁶⁷⁴ We have concluded that the Court’s “judicial exceptions” to § 101 for “laws of nature, physical phenomena, and abstract ideas” are overbroad, misguided, inconsistent with the statute, and unworkable in practice. Accordingly, in this part, we endeavor to provide a “new” framework for the § 101 analysis that is clear, workable, and can predictably determine the subject-matter eligibility of any patent claim. Importantly, the framework we provide is grounded firmly in the statutory text, and it is consistent with the Court’s most recent patent-eligibility decision in *Myriad*.

Indeed, as we have described at length, we believe the *Myriad* decision was a significant departure from the Court’s prior § 101 jurisprudence. In particular, *Myriad* eschewed both the “inventive concept” test and any consideration of “preemption” concerns, two core principles which dominated most of the Court’s prior patent-eligibility decisions.⁶⁷⁵ We propose that *Myriad*’s departure from precedent presents a unique opportunity for the Supreme Court to hit

672. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 134–35 (1948) (Frankfurter, J., concurring).

673. *Diamond v. Diehr*, 450 U.S. 175, 189 n.12 (1981).

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

675. *See supra* Part III.G.

“reset” on its § 101 jurisprudence in future cases, using *Myriad* as a pivot point and foundation for a “new” interpretation of § 101.

A. Myriad to the Rescue: A “New” Framework for Patent Eligibility

We propose that the judicial exceptions to § 101 for “laws of nature, physical phenomena, and abstract ideas”—as well as the “inventive concept” test and any “preemption” concerns—should all be eliminated from the patent-eligibility analysis. In their stead, we propose consulting the statutory language of § 101 itself, including (a) the listed categories of patent-eligible subject matter, and (b) the requirement that patent-eligible subject matter must be “new.”⁶⁷⁶ Based on these express statutory requirements, we propose that a claim should be found to recite patent-eligible subject matter if and only if the following questions are both answered in the affirmative: “(1) Does the claim, considered as a whole, literally recite a ‘process, machine, manufacture, or composition of matter?’ (2) If so, is the claimed process, machine, manufacture, or composition of matter one that is ‘new’ to the world?”

The proposed framework closely tracks the plain language of § 101, which expressly states that “any *new* and useful *process, machine, manufacture, or composition of matter*” constitutes patent-eligible subject matter.⁶⁷⁷ Moreover, the proposed framework is functionally equivalent to the two-step analysis the Supreme Court effectively applied in *Myriad*, the Court’s most recent patent-eligibility decision. We elaborate below as to the application of the proposed framework to various actual and hypothetical fact patterns, including the facts of *Myriad* and other cases.

Under the first step of the proposed framework, the court would focus on the categories of patent-eligible subject matter expressly listed in § 101—i.e., “process, machine, manufacture, or composition of matter.”⁶⁷⁸ The focus should be on what is *literally* recited in the patent claim, considering the claim *as a whole*. To the extent that multiple claims are at issue, each claim must be considered individually on its own merits. Ultimately, any claim that literally recites a process, machine, manufacture, or composition of matter—under the plain and ordinary meaning of those terms—would satisfy

676. 35 U.S.C. § 101 (2012).

677. *Id.* (emphasis added).

678. *Id.*

the first step of the proposed framework. The analysis would then proceed to step two. On the other hand, if a patent claim *fails* to literally recite subject matter within the § 101 categories, the claim would immediately be found patent ineligible, ending the analysis.

We do not further belabor the first step of the proposed analysis, as the Court has long considered the § 101 categories at the onset of virtually every patent-eligibility analysis, with this base requirement typically found to be satisfied. For example, before applying the judicial exceptions in *Benson*, *Flook*, *Chakrabarty*, *Diehr*, *Bilski*, *Mayo*, and *Myriad*, the Court initially found that the claims at issue in each case recited subject matter that literally fell within the § 101 categories.⁶⁷⁹ As a practical matter, patent claims that recite subject matter literally *outside* of the § 101 categories are unlikely to be filed by patentees and even less likely to be issued by the United States Patent and Trademark Office. As such, this initial step of the proposed framework would generally serve as a “coarse eligibility filter,”⁶⁸⁰ weeding out or deterring claims that do not even attempt to recite patent-eligible subject matter under § 101.

If the first requirement is satisfied—i.e., if the claim literally recites a “process, machine, manufacture, or composition of matter”—then the second step of the framework focuses on the § 101 requirement that patent-eligible subject matter must be “new.” As we have described at length, we believe the term “new” was added to the definition of patent-eligible subject matter specifically to clarify that something must be “new” *to the world* to be patent eligible under § 101, regardless of whether the claimed subject matter is novel under § 102.⁶⁸¹ For this analysis, we propose that claimed subject matter is “new” to the world if and only if the claimed “process,

679. See *Myriad*, 133 S. Ct. at 2113, 2116–17 (finding that the claimed DNA sequences fell into the “composition of matter” category); *Mayo*, 132 S. Ct. at 1294 (finding that the claims at issue “cover[ed] processes that help doctors who use thiopurine drugs . . . determine whether a given dosage level is too low or too high”); *Bilski*, 130 S. Ct. at 3225 (“The present case involves an invention that is claimed to be a ‘process’ under § 101.”); *Diehr*, 450 U.S. at 177 (“The claimed invention is a process for molding raw, uncured synthetic rubber into cured precision products.”); *Chakrabarty*, 447 U.S. at 309 (finding that the claim at issue was directed to a “manufacture or composition of matter”); *Flook*, 437 U.S. at 588 (“It is true, as respondent argues, that his method is a ‘process’ in the ordinary sense of the word.”); *Benson*, 409 U.S. at 68 (noting that “the present case deals with a ‘process’ claim”).

680. *Ultramercial, Inc. v. Hulu, LLC*, 722 F.3d 1335, 1354 (Fed. Cir. 2013).

681. See *supra* Part V.F.

machine, manufacture, or composition of matter” does not typically occur or exist in nature absent human input or intervention.

For clarity, it is helpful to describe what step two of the proposed framework is *not*. First, unlike the Court’s “inventive concept” test, the question of whether the claimed subject matter is “new” to the world does not involve any dissection of the patent claim at issue. The framework does not call for a subjective identification of any “abstract idea” or “law of nature” “*underlying*” the patent claim.⁶⁸² Rather, as for step one, the claim should again be considered *as a whole* for step two of the analysis. In other words, the level of generality at which to analyze the claimed subject matter is dictated solely by the limitations actually recited in the claim—nothing more, nothing less. This reflects the “‘bedrock principle’ of patent law that ‘the claims of a patent define the invention.’”⁶⁸³

Second, the analysis of whether the claimed subject matter is “new” to the world should not invoke any considerations regarding claim overbreadth, abstractness, or preemption. Such concerns are appropriately analyzed under the enablement and definiteness requirements of § 112.⁶⁸⁴

Third, the § 101 requirement that patent-eligible subject matter must be “new” should not be confused with the novelty or non-obviousness requirements. Because the patent-eligibility inquiry under § 101 has no *time* element, subject matter that is patent eligible today should never cease to be patent eligible, regardless of the level of knowledge in the art.⁶⁸⁵ Thus, the § 101 inquiry should not be concerned with who invented or discovered the claimed subject matter first, or with the simplicity of the claimed subject matter given the state of the art. Such concerns are appropriately addressed under the § 102 novelty and § 103 obviousness inquiries, respectively. The patent-eligibility inquiry under § 101 should be concerned solely with the *type* of subject matter claimed. Thus, under our proposal, the question of whether the claimed subject matter is “new” to the world as required by § 101 would hinge solely on whether the recited

682. *Mayo*, 132 S. Ct. at 1293–94 (emphasis added).

683. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)); *see also* *Altoona Publix Theatres v. Am. Tri-Ergon Corp.*, 294 U.S. 477, 487 (1935) (“Under the statute, it is the claims of the patent which define the invention.”).

684. *See supra* Parts V.B–C.

685. *See supra* Part V.D.

“process, machine, manufacture, or composition of matter” typically exists or occurs in nature absent human input or intervention, regardless of when the subject matter was invented or discovered.

Fourth, the claimed subject matter will be considered “new” to the world so long as it does not *typically* exist or occur in nature absent human input or intervention. As the *Myriad* Court recognized, a mere “possibility that an unusual and rare phenomenon *might* randomly create” the claimed subject matter does not defeat its patent eligibility.⁶⁸⁶ In our view, subject matter that does not *typically* exist in nature can always be considered “new” under § 101—given the ordinary meaning of that term—even if the claimed subject matter could in theory result from an improbable random occurrence.

Finally, as a practical matter, the second step of our framework will likely have significance for only two of the four categories of statutory subject matter—the “process” and “composition of matter” categories.⁶⁸⁷ There are countless “process[es]” and “composition[s] of matter” that typically occur or exist in nature and thus cannot be considered “new” to the world. In contrast, if a claim recites subject matter that literally falls within the “machine” or “manufacture” categories of § 101, then the claimed subject matter is likely “new” to the world, as machines and manufactures by definition exist solely due to human activity—i.e., they are things “made by man.”⁶⁸⁸

As an exemplary application of the proposed framework, we first revisit the facts of *Myriad*, the Court’s most recent patent-eligibility decision.⁶⁸⁹ *Myriad* discovered two human DNA sequences—the BRCA1 and BRCA2 genes—which can be used to assess a patient’s risk of developing breast or ovarian cancer.⁶⁹⁰ *Myriad* sought patent claims directed to (a) isolated DNA sequences relating to the BRCA1 and BRCA2 genes, and (b) synthetically created cDNA sequences derived from the BRCA1 and BRCA2 genes.⁶⁹¹

686. *Myriad*, 133 S. Ct. at 2119 n.8.

687. 35 U.S.C. § 101 (2012).

688. *Chakrabarty*, 447 U.S. at 309 (quoting S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952)).

689. *Myriad*, 133 S. Ct. at 2107; *see also supra* Part III.G.

690. *Id.* at 2110–13.

691. *Id.* at 2111–12.

Under the first step of the proposed framework, we assess whether each claim, considered as a whole, literally recites a “process, machine, manufacture, or composition of matter”—i.e., subject matter literally within one of the § 101 categories. We find it clear that all of the claims at issue in *Myriad* literally recited “composition[s] of matter”—i.e., compositions of nucleotides which form the claimed DNA and cDNA sequences. We note that the *Myriad* Court reached the same preliminary conclusion.⁶⁹²

With step one satisfied for all of *Myriad*’s challenged claims, we next ask whether the particular “composition of matter” recited in each claim is “new” to the world. For this analysis, a “composition of matter” is “new” to the world if and only if it does not typically exist in nature absent human input or intervention. Again, each patent claim at issue must be considered as a whole and on its own merits. If a claim reads on any composition of matter that is *not* “new” to the world, then it recites subject matter that is patent ineligible under § 101.

Proceeding under step two, we first consider *Myriad*’s claims directed to isolated DNA sequences. Exemplary Claim 1 recites “[a]n isolated DNA coding for a BRCA1 polypeptide”—i.e., the entire BRCA1 sequence.⁶⁹³ This claim clearly fails step two, as the BRCA1 nucleotide sequence typically exists in nature, as part of the human genome, without human input or intervention. Likewise, dependent Claim 5 recites “[a]n isolated DNA having at least 15 nucleotides of the DNA of claim 1.”⁶⁹⁴ This claim similarly fails step two, as it reads on any contiguous sequence of 15+ nucleotides that naturally exists in the BRCA1 portion of the human genome. Accordingly, because Claims 1 and 5 both read on compositions of matter that are not “new” to the world, these claims each recite subject matter that is patent ineligible under § 101.

Our framework’s treatment of the foregoing isolated DNA claims is consistent with the Supreme Court’s holding in *Myriad*. Specifically, the *Myriad* Court found that “[t]he location and order of the nucleotides *existed in nature* before *Myriad* found them.”⁶⁹⁵

692. *Id.* at 2113, 2116–17 (finding that the claimed DNA and cDNA sequences each literally recited a “composition of matter”).

693. *Id.* at 2113.

694. *Id.*

695. *Myriad*, 133 S. Ct. at 2116 (emphasis added)

Myriad's discovery of the naturally occurring BRCA1 sequence thus did "not render the BRCA genes 'new . . . composition[s] of matter' that are patent eligible."⁶⁹⁶ As such, the Court held that Myriad's claims to isolated DNA sequences were invalid under § 101.⁶⁹⁷

We next apply step two of the proposed framework to Myriad's cDNA claims. Exemplary Claim 2, for example, recites a cDNA sequence derived from isolated BRCA1—i.e., a sequence containing only the exon nucleotides from BRCA1, with all intervening intron nucleotides removed.⁶⁹⁸ Unlike the sequences of Claims 1 and 5, the cDNA sequence recited in claim 2 does *not* typically exist in nature without human input or intervention, as the precise nucleotide sequence claimed presumably cannot be found in the human genome. As such, the cDNA recited in Claim 2 is a composition of matter that is "new" to the world, rendering it patent eligible under § 101.

Our framework's treatment of Claim 2 is likewise consistent with the Supreme Court's holding in *Myriad*. The Court reasoned that "cDNA does not present the same obstacles to patentability as naturally occurring, isolated DNA segments," because "creation of a cDNA sequence . . . results in an exons-only molecule that is *not naturally occurring*."⁶⁹⁹ The key fact, the Court held, was that "the lab technician unquestionably creates something *new* when cDNA is made," rendering the claimed cDNA patent eligible under § 101.⁷⁰⁰

Claim 6 of Myriad's patent is also directed to cDNA, but applying step two of our framework yields a different result. Claim 6 recites "[a]n isolated DNA having at least 15 nucleotides of the DNA of claim 2," effectively claiming any 15+ nucleotide sequence found in cDNA derived from the BRCA1 gene.⁷⁰¹ As previously discussed, cDNA is created by removing intron sequences from isolated DNA, keeping only the exon sequences.⁷⁰² But exon sequences are often more than 15 nucleotides in length.⁷⁰³ Claim 6 would thus read on any 15+ nucleotide sequence that naturally exists within a single exon of the BRCA1 gene. Therefore, assuming the BRCA1 gene

696. *Id.* at 2117 (quoting 35 U.S.C. § 101) (emphases added).

697. *Id.* at 2119.

698. *Id.* at 2113.

699. *Id.* at 2119 (emphasis added).

700. *Id.* (emphasis added).

701. *Id.*

702. *Id.* at 2112.

703. *See supra* note 353.

includes at least one 15+ nucleotide exon, Claim 6 reads on one or more nucleotide sequences that are not “new” to the world, rendering the claim invalid under § 101.

The foregoing conclusion regarding Claim 6 is again consistent with the Supreme Court’s holding in *Myriad*. Specifically, the Court held that cDNA was typically patent eligible, “*except* insofar as very short series of DNA may have *no intervening introns to remove* when creating cDNA.”⁷⁰⁴ “In that situation,” the Court held, “a short strand of cDNA may be indistinguishable from natural DNA.”⁷⁰⁵ In other words, to pass muster under § 101, a patent claim cannot read on any nucleotide sequence that exists in the human genome.

Thus, under both the proposed framework and *Myriad*, the key factors to patent eligibility are (1) whether the claim literally recites a “process, machine, manufacture, or composition of matter”; and (2) whether the claimed subject matter is “new” to the world. Under step one, *Myriad*’s claims recited nucleotide sequences, which are “composition[s] of matter.” Under step two, *Myriad*’s claims that solely read on nucleotide sequences that are “new” to the world are patent eligible (e.g., cDNA with intervening introns removed), whereas *Myriad*’s claims that read on one or more nucleotide sequences that exist in the human genome are not patent eligible (e.g., isolated BRCA1, or any contiguous portion thereof).

We note that, in reaching its holding, the *Myriad* Court reasoned that the mere act of “*isolating* DNA from the human genome” does not render the isolated nucleotide sequence patent eligible.⁷⁰⁶ We agree. In fact, such considerations are already subsumed within step two of our proposed framework, which asks whether the claimed process, machine, manufacture, or composition of matter is “new” to the world. A contiguous nucleotide sequence extracted from the human genome cannot be considered a “*new . . . composition of matter*” in any reasonable sense; it can at most be viewed as a naturally existing “composition of matter” that has been found and harvested. For example, a plant found in nature does not become a “*new . . . composition of matter*” when clipped from its stem, nor does a slab of stone become “new” when extracted from a quarry.

704. *Myriad*, 133 S. Ct. at 2119 (emphasis added).

705. *Id.*

706. *Id.* at 2118 (emphasis added).

But if “isolation” from nature does not confer patent eligibility, how should the law treat something like a wooden baseball bat, given that the bat is merely a piece of wood “isolated” from a tree? *Myriad* raised this hypothetical before the Supreme Court, contending that the clear patent eligibility of a wooden baseball bat necessitates the patent eligibility of an isolated DNA sequence.⁷⁰⁷ The Court rejected this argument and found isolated DNA patent ineligible, but it did not address the baseball-bat hypothetical in its opinion.⁷⁰⁸ Our proposed framework, however, offers a straightforward means for distinction: *Look to the actual limitations recited in the claim.*

For example, a claim to a wooden baseball bat which merely recites “a piece of wood sufficient for a person to swing” would fail to satisfy § 101 under the proposed framework, as the claim would literally read on a “composition of matter” that typically exists in nature—e.g., a fallen tree branch. In contrast, a more specific claim to a wooden baseball bat might read something like the following:

A wooden baseball bat turned from a single piece of wood, comprising:

- (a) a cylindrical barrel having a first diameter sufficient to strike a baseball;
- (b) a cylindrical handle having a second diameter less than said first diameter and sufficient for a person to grip;
- (c) a tapered portion connecting said barrel and said handle; and
- (d) a cylindrical knob connected to the base of said handle and having a third diameter less than said first diameter and greater than said second diameter.

The later claim’s structural and functional limitations clearly place the recited subject matter into the “machine” or “manufacture” categories of § 101, rather than the “composition of matter” category. Moreover, the recited “machine” or “manufacture” is clearly “new” to the world, as wooden baseball bats with the precise structural and functional attributes claimed do not typically exist in nature absent human input or intervention. Accordingly, the later claim would recite patent-eligible subject matter under § 101.

707. See Brief for Respondents at 40–43, *Myriad*, 133 S. Ct. 2107 (2013) (No. 12-398); Transcript of Oral Argument at 37, 41 & 48, *Myriad*, 133 S. Ct. 2107 (2013) (No. 12-398).

708. See *Myriad*, 133 S. Ct. at 2116–19.

We have shown above how the proposed framework is entirely consistent with the Supreme Court's decision in *Myriad*. The framework is similarly consistent with the Court's decision in *Chakrabarty*, wherein the Court considered a claim directed to a genetically engineered bacterium capable of breaking down crude oil.⁷⁰⁹ The Court found the claimed bacterium patent eligible under § 101, reasoning that the patentee had "produced a *new* bacterium with markedly different characteristics from any found in nature."⁷¹⁰ Likewise, the genetically engineered bacterium would be found patent eligible under our proposed framework, because (1) the genetically-engineered bacterium falls into the "composition of matter" category of § 101, and (2) the genetically-engineered bacterium is "new" to the world, as it does not typically exist in nature without human input or intervention.

However, the proposed framework would reach a different result than the Supreme Court's ruling in *Funk Bros*. In that case, the patentee claimed an inoculant mixture for plants comprising multiple strains of bacteria that would not inhibit each other's effects.⁷¹¹ The Court found the claimed inoculant mixture patent ineligible, reasoning that (a) the individual species of bacteria in the claimed inoculant mixture were each products of nature, and (b) the patent did not claim any inventive concept beyond the underlying "natural principle" that certain strains of bacteria do not inhibit each other's effects.⁷¹² The § 101 analysis and outcome would differ under our proposed framework.

Under the first step of the proposed framework, the claim from *Funk Bros*. would be considered as a whole to determine whether it recites subject matter that falls within the § 101 statutory categories. Because the claimed inoculant mixture is a "composition of matter," this initial requirement is satisfied. Step two of our framework would then ask whether the claimed inoculant mixture *as a whole* is "new" to the world. This differs from the Court's analysis in *Funk Bros.*, which dissected the claim and focused on the fact that the individual species of bacteria comprising the claimed inoculant mixture were

709. *Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980).

710. *Id.* at 310 (emphasis added).

711. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 128–30 (1948).

712. *Id.* at 131.

each products of nature.⁷¹³ In contrast, under the proposed framework, the claimed inoculant mixture *as a whole* is a “composition of matter” that is “new” to the world, because there is no indication that the claimed *mixture* of multiple species of bacteria typically exists in nature without human input or intervention. As such, the claimed inoculant mixture of *Funk Bros.* would be patent eligible under the proposed framework.

While the foregoing applications of the proposed framework concern “composition of matter” claims, the analysis is substantially the same for claims directed to the other categories of statutory subject matter. Consider, for example, the previously discussed hypothetical method of curing cancer by injecting lunar dust into a patient’s bloodstream.⁷¹⁴ The hypothetical claim reads as follows: A method of curing cancer, comprising the steps of: (1) dissolving 250mg to 500mg of lunar dust in a liquid solution; (2) injecting said liquid solution containing said lunar dust into the bloodstream of a cancer patient; and (3) curing the patient of cancer.

The foregoing claim satisfies step one of the proposed framework, as it recites subject matter that literally falls into the “process” category of § 101. The claim further satisfies step two, as the claimed “process” of curing cancer is “new” to the world. Specifically, there is no indication that the claimed process of curing cancer with lunar dust typically occurs in nature without human input or intervention. Accordingly, under the proposed framework, the foregoing claim recites patent-eligible subject matter.

It should be noted that the patent eligibility of the foregoing “process” of curing cancer is not affected by the mere fact that it utilizes a “composition of matter”—lunar dust—that typically exists in nature. Under the proposed framework, a “process” may be “new” to the world, even if it involves the use of products of nature which are not themselves patent eligible. Thus, a “process” of curing cancer with lunar dust is patent eligible, even though the lunar dust itself would not be patent eligible in a “composition of matter” claim.

Of course, there are a multitude of processes that typically occur in nature without human input or intervention and thus cannot be considered “new” to the world. For example, a chemical process that

713. *Id.*

714. *See supra* Part V.F.

typically occurs in swamplands, a biological process that typically occurs in a natural organism, or a naturally occurring weather process each would not be patent eligible under the proposed framework. Moreover, a “process” which typically exists in nature without human input or intervention does not automatically become a “new” process when recreated in a lab. For example, a naturally occurring biological process does not become a “new” process when recreated in a petri dish. This is a corollary to the previously discussed principle that mere “isolation” from nature does not render a “composition of matter” patent eligible.

Needless to say, the foregoing exemplary applications of the proposed framework do not endeavor to address every possible nuance or fact pattern that might arise regarding patent eligibility. The framework would be further refined through the development of a new body of patent-eligibility jurisprudence building upon *Myriad*. The important thing, in our view, is that the analysis should proceed by asking the correct questions: (1) whether the claim literally recites a “process, machine, manufacture, or composition of matter”; and (2) whether the claimed subject matter is “new” to the world.

Finally, it should always be remembered that a finding of patent *eligibility* under § 101 does not itself render a claim *patentable*. The other patentability requirements must additionally be satisfied, such as the requirements of novelty,⁷¹⁵ non-obviousness,⁷¹⁶ enablement,⁷¹⁷ written description,⁷¹⁸ and definiteness.⁷¹⁹ Indeed, even as the *Myriad* Court found certain claims to cDNA patent eligible under § 101, it “express[ed] no opinion [as to] whether cDNA satisfies the other statutory requirements of patentability.”⁷²⁰

B. Closing the Circle: A “New” Facet to the Obviousness Inquiry

Under the proposed framework, a “composition of matter” that typically exists in nature is not “new” to the world and thus is not patent eligible under § 101. Thus, the sap of a tree discovered in the

715. 35 U.S.C. § 102 (2012).

716. 35 U.S.C. § 103 (2012).

717. 35 U.S.C. § 112(a) (2012).

718. *Id.*

719. 35 U.S.C. § 112(b) (2012).

720. *See Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2119 n.9 (2013) (“We express no opinion whether cDNA satisfies the other statutory requirements of patentability. *See, e.g.*, 35 U.S.C. §§ 102, 103, and 112 . . .”).

Amazon (let us call it an “Eden” tree) would not be patent eligible, as the sap typically exists in nature without human input or intervention and thus is not “new” to the world. However, if one were to discover that sap from the Eden tree is an effective treatment for acne when applied to human skin, this “new . . . process” of treating acne would be patent eligible under the proposed framework. Unlike the sap itself, the claimed “process” of treating acne does not typically exist in nature absent human input or intervention, as the process requires sap to be extracted from an Eden tree and applied to a person’s skin.

This raises an interesting question of fundamental importance: Even though sap from the Eden tree would be patent ineligible as a “composition of matter,” could a patentee effectively capture all uses of this naturally occurring substance by simply claiming a “process” of *harvesting* sap from an Eden tree? An exemplary claim might read: “A method of harvesting Eden tree sap, comprising the steps of (a) locating an Eden tree, (b) extracting sap from the trunk of said Eden tree, and (c) storing the extracted sap in a sealed receptacle.” Such a claim would recite a “process” that is “new” to the world, as the claimed process of harvesting sap from the Eden tree does not typically occur in nature absent human input or intervention. Thus, under a straightforward application of the proposed framework, the foregoing claim recites patent-eligible subject matter under § 101.

The scenario above illustrates a danger that patent eligibility might be gamed through artful claim drafting. At a gut-check level, many would likely agree that if sap from an Eden tree is unpatentable, a claim directed to a generic method of harvesting the sap should be unpatentable as well. Any contrary conclusion would allow a patentee to effectively capture all uses of the Eden tree sap, even though the sap itself is barred from patentability under § 101. The key question is whether the Patent Act offers an objective and logical means to prevent such apparently inconsistent results.

As a preliminary observation, we note that the answer to the foregoing riddle cannot logically extend from the patent-*eligibility* requirement of § 101, as a “method of harvesting Eden tree sap” is clearly a “process” that is “new” to the world. The simplistic or trivial nature of a claimed “process” is wholly irrelevant to the patent-eligibility inquiry, as § 101 is solely concerned with the *type* of subject matter claimed. Indeed, if a patentee were to invent a particularized method of harvesting tree sap that is novel, non-

obvious, definite, and fully enabled by the patent's specification, then such a "process" applied to harvesting sap from an Eden tree certainly would not be barred from patent eligibility under § 101. Thus, because § 101 offers no statutory basis for distinguishing between different "process[es]" that are "new" to the world, the patent-eligibility inquiry cannot solve this quandary.

Nor could the patentability of the claimed "method of harvesting Eden tree sap" be challenged under the novelty requirement of § 102. A patent claim is anticipated under § 102 only if "each and every [claimed] limitation is found either expressly or inherently in a single prior art reference."⁷²¹ Because the patentee in our hypothetical was the first person to ever harvest sap *from an Eden tree*—an express claim limitation—the invention is clearly novel under § 102.

Likewise, under prevailing doctrine, the claimed "method of harvesting Eden tree sap" could arguably satisfy the non-obviousness requirement of § 103. Under § 103, a patent may not be obtained if "the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art."⁷²² Let us assume that the claimed means of harvesting tree sap (from *any* type of tree) was merely a routine and conventional process that had long been well-known in the relevant field. Under that scenario, the claimed "method of harvesting *Eden tree* sap" would still arguably be non-obvious under § 103, as the patentee was the first to discover the existence of the Eden tree and its sap. Without knowledge of the Eden tree's existence, the patentee would argue, a person of ordinary skill in the art could not have found it obvious to harvest Eden tree sap. In other words, to establish the non-obviousness of the claimed process under § 103, the patentee would distinguish the prior art based solely upon his *discovery of things that exist in nature*—i.e., the Eden tree and its sap—which are not themselves patent eligible under § 101.

The foregoing example illustrates the potential for seemingly inconsistent results—(a) an Eden tree is patent ineligible under § 101, yet discovery of the Eden tree might be the sole basis for a claim's patentability under § 103; and (b) Eden tree sap is patent ineligible as a "composition of matter" under § 101, yet a patent-

721. *Whitserve, LLC v. Computer Packages, Inc.*, 694 F.3d 10, 21 (Fed. Cir. 2012) (quoting *Celeritas Techs., Ltd. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998)).

722. 35 U.S.C. § 103.

eligible “method of harvesting Eden tree sap” could effectively capture all uses of the patent-ineligible composition of matter. The fundamental underlying question, which has lurked just beneath the surface of more than a century of patent-eligibility jurisprudence, can be stated as follows: Where a claim as a whole recites patent-*eligible* subject matter, to what extent can claim elements that would be patent *ineligible* if claimed alone be used to distinguish the claim from the prior art?

We believe that the Supreme Court’s failure to directly address and answer the foregoing question has been a core source of the confusion that has long plagued the patent-eligibility inquiry. Apparently sensing the issue—but failing to directly articulate it—the Court created the “inventive concept” test in an effort to avoid inconsistencies such as those described above. Under that test, the patent-ineligible law of nature, physical phenomena, or abstract idea that the Court identifies as underlying the claim at issue “*is treated as though it were a familiar part of the prior art,*” effectively excising it from the claim.⁷²³ The claim is then found to be patent eligible under § 101 only if the claim’s “other elements” collectively recite an “inventive concept”—i.e., more than mere “routine, conventional activity previously engaged in by researchers in the field.”⁷²⁴

But as we have described at length, the “inventive concept” test is deeply flawed.⁷²⁵ Unlike our proposed framework, the “inventive concept” test focuses on the Court’s judicial exceptions to patent eligibility for “[l]aws of nature, natural phenomena, and abstract ideas,”⁷²⁶ which we have demonstrated are overbroad, inconsistent with the statute, and unworkable in practice.⁷²⁷ Moreover, as the Supreme Court has itself admitted, “ignoring *all* laws of nature when evaluating a patent . . . would ‘make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.’”⁷²⁸

723. *Parker v. Flook*, 437 U.S. 584, 597 (1978); *see also Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293–94 (2012).

724. *Mayo*, 132 S. Ct. at 1294.

725. *See supra* Part V.D.

726. *Mayo*, 132 S. Ct. at 1293 (citation omitted).

727. *See supra* Part V.

728. *Mayo*, 132 S. Ct. at 1304 (quoting *Diehr*, 450 U.S. at 189 n.12).

As will be described further below, we do agree that at least *some* patent-ineligible subject matter *should* be viewed as prior art. However, such findings should be relevant only to an *obviousness* analysis under § 103. There is no statutory basis for importing obviousness considerations into the § 101 analysis,⁷²⁹ and doing so invites subjective determinations outside of the detailed obviousness framework that is defined by a rich body of § 103 jurisprudence.⁷³⁰

But if some patent-ineligible subject matter is to be treated as prior art for the purposes of an obviousness analysis under § 103, what is the statutory basis for doing so, and where should the line be drawn? “[T]oo broad an interpretation of this exclusionary principle could eviscerate patent law,”⁷³¹ while too narrow an interpretation would leave room for gamesmanship and inconsistent results such as those described above. To answer this riddle, we turn once again to Chief Judge Rader’s mantra: “When all else fails, consult the statute!”⁷³²

Section 103 of the Patent Act reads in its entirety as follows:

A patent for a claimed invention may not be obtained, *notwithstanding that the claimed invention is not identically disclosed as set forth in section 102*, if the differences between the claimed invention and the *prior art* are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.⁷³³

Section 103 does not expressly define what sources may be considered “prior art” in the obviousness inquiry. The antecedent phrase “notwithstanding that the claimed invention is not identically disclosed as set forth in section 102” has been interpreted as

729. See *supra* notes 579–594 and accompanying text.

730. See, e.g., *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *United States v. Adams*, 383 U.S. 39 (2001); *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969); *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966); *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147 (1950); *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850).

731. *Mayo*, 132 S. Ct. at 1293.

732. *CLS Bank*, 717 F.3d at 1335 (Rader, C.J., Additional Reflections).

733. 35 U.S.C. § 103 (emphasis added).

indicating that the “prior art” includes *at least* the categories of prior art defined under § 102.⁷³⁴ Importantly, however, there is nothing in § 103 that necessarily limits the “prior art” solely to § 102 prior art. To the contrary, the Federal Circuit has expressly recognized that “section 102 is not the only source of section 103 prior art.”⁷³⁵ For example, “prior art may be created by the admissions of the parties,” such as an admission in the patent’s specification or prosecution history that certain subject matter constitutes “prior art,” even if there is no basis for that subject matter to qualify as prior art under § 102.⁷³⁶ As another example, “common sense” improvements and “common knowledge” may be considered in the obviousness analysis, even if not disclosed in any § 102 prior art reference.⁷³⁷ We posit that, in addition to the foregoing sources of prior art that may be considered in the obviousness inquiry, there is also a set of prior

734. See *Riverwood Int’l Corp. v. R.A. Jones & Co., Inc.*, 324 F.3d 1346, 1354 (Fed. Cir. 2003) (“The term ‘prior art’ as used in section 103 refers *at least* to the statutory material named in 35 U.S.C. § 102.”) (emphasis added); *In re Wertheim*, 646 F.2d 527, 532 (CCPA 1981) (“[W]e have held that the term ‘prior art’ refers to *at least* the statutory prior art material named in § 102.”) (emphasis added) (internal quotation marks and citation omitted); see also S. Rep. No. 1979, 82nd Cong., 2d Sess. (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, at 2399 (“Section 103 . . . refers to the difference between the subject matter sought to be patented and the prior art, meaning what was known before as described in section 102.”).

735. *Riverwood*, 324 F.3d at 1354 (Fed. Cir. 2003); see also *In re Fout*, 675 F.2d 297, 300 (CCPA 1982) (“This court has recognized that section 102 is not the only source of section 103 prior art.”).

736. *Riverwood*, 324 F.3d at 1354; see *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1362 (Fed. Cir. 2007) (“Admissions in the specification regarding the prior art are binding on the patentee for purposes of a later inquiry into obviousness.”); *Constant v. Advanced Micro-Devices*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) (“A statement in a patent that something is in the prior art is binding on the applicant and patentee for determinations of anticipation and obviousness.”); *Sjolund v. Musland*, 847 F.2d 1573, 1577–79 (Fed. Cir. 1988) (where patent specification admitted that certain subject matter was prior art, “the jury was not free to disregard [that subject matter]” and “must have accepted [it] as prior art, as a matter of law”); see also *In re Fout*, 675 F.2d at 300; *In re Nomiya*, 509 F.2d 566, 571 (CCPA 1975); *In re Hellsund*, 474 F.2d 1307, 1386 (CCPA 1973); *In re LoPresti*, 333 F.2d 932, 934 (CCPA 1964); John Burke, *The Prior Art By Admission Doctrine: Judicially Created Private Prior Art*, 13 FED. CIR. B.J. 607 (2004) (gathering and discussing cases); Lance Leonard Barry, *Anything You Say Can Be Used Against You: Admissions of Prior Art*, 82 J. PAT. & TRADEMARK OFF. SOC’Y 347 (2000) (gathering and discussing cases).

737. See, e.g., *KSR*, 127 U.S. at 420–21 (“Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.”); *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) (holding that “an analysis of obviousness . . . may include recourse to logic, judgment, and common sense available to the person of ordinary skill that do not necessarily require explication in any reference or expert opinion”); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969) (holding that an examiner may find obviousness based on “common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference”).

art defined by § 101. We propose the following rule: “Pursuant to § 101, any ‘process, machine, manufacture, or composition of matter’ that is *not* ‘new’ to the world is ‘prior art’ for the purposes of a § 103 obviousness analysis.”

The logic of the proposed § 101 prior-art rule is straightforward, and it is firmly grounded in the statutory text. First, § 101 lists the categories of subject matter that are potentially patent eligible—i.e., any “process, machine, manufacture, or composition of matter.”⁷³⁸ Second, under our framework, anything that falls into these statutory categories is patent eligible, *provided that* it is “new” to the world.⁷³⁹ But if a “process, machine, manufacture, or composition of matter” is *not* “new” to the world, it is unpatentable under § 101. In such case, the subject matter’s prior existence in nature is the *sole* reason for its unpatentability under § 101. In other words, a “process, machine, manufacture, or composition of matter” that is not “new” to the world is unpatentable under § 101, not because it falls outside the statutory categories, but rather because it is in effect *anticipated by nature*. In this regard, § 101 and § 102 can be viewed as two sides of the same coin—the former defining a set of prior art created by nature, and the latter defining a set of prior art created by man.⁷⁴⁰

Indeed, the fundamental principle underlying the concept of prior art is that “Congress may not authorize the issuance of patents whose effects are to remove [subject matter] from the public domain, or to restrict free access to materials already available.”⁷⁴¹ If a “process, machine, manufacture, or composition of matter” is unpatentable under § 101 because it is not “new” to the world, then that subject matter is unquestionably within the public domain. For example, if a “composition of matter” is unpatentable under § 101 because it exists in nature and thus is not “new” to the world, then that composition of matter is necessarily a material to which all members of the public are entitled free access.

738. 35 U.S.C. § 101.

739. *Id.*

740. *See* 35 U.S.C. § 101 (“Whoever invents or discovers and *new* and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefor . . .”) (emphasis added); 35 U.S.C. § 102(a) (“A person shall be entitled to a patent unless—(1) the claimed invention was *patented*, described in a *printed publication*, or in *public use*, on *sale*, or otherwise available to the public before the effective filing date of the claimed invention; . . .”) (emphases added).

741. *Graham*, 383 U.S. at 6.

Moreover, a patent may not “remove from the public that which is in the public domain by virtue of its inclusion in, *or obviousness from*, the prior art.”⁷⁴² In other words, “*obvious variants* of prior art references are themselves part of the public domain.”⁷⁴³ Accordingly, because a “process, machine, manufacture, or composition of matter” that exists in nature is within the public domain, obvious variants and uses thereof should be viewed as within the public domain as well. Thus, if a natural “process” is unpatentable under § 101 because it is not “new” to the world, then obvious variants and uses of the natural process should be unpatentable as well. In such cases, the necessary conclusion is that the natural subject matter must be viewed as “prior art” for the purposes of an obviousness analysis under § 103.

Finally, the fact that a patentee may have been first to uncover the existence of certain subject matter in nature is irrelevant to the § 103 inquiry, because “actual knowledge of the [subject matter] is not required for [it] to be considered prior art.”⁷⁴⁴ “To determine patentability, a hypothetical person [having ordinary skill in the art] is presumed to know all the pertinent prior art, whether or not the applicant [was] actually aware of its existence” prior to the alleged invention.⁷⁴⁵ This “conclusive presumption of knowledge of such prior art is, in effect, a statutorily required fiction.”⁷⁴⁶ We see no reason this legal fiction should not apply equally to both prior art defined under § 101 and prior art defined under § 102.

Accordingly, under the proposed § 101 prior-art rule, the obviousness analysis under § 103 would presume that a hypothetical person having ordinary skill in the art has full knowledge of the *existence* of every “process, machine, manufacture, and composition of matter” that is *not* “new” to the world—i.e., that typically exists or occurs in nature without human input or intervention.

It is equally important to note what knowledge our proposed rule would *not* automatically attribute to the hypothetical person having ordinary skill in the art. While the person of ordinary skill would be presumed to have knowledge of the *existence* of every naturally

742. *In re Huai-Hung Kao*, 639 F.3d 1057, 1073 (Fed. Cir. 2011) (quoting *In re Wiseman*, 596 F.2d 1019, 1023 (CCPA 1979)) (emphasis added).

743. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007) (emphasis added).

744. *In re Carlson*, 983 F.2d 1032, 1038 (Fed. Cir. 1992).

745. *Id.*; see also *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (“The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art.”).

746. *In re Howarth*, 654 F.2d 103, 106 (Fed. Cir. 1981).

occurring “process, machine, manufacture, and composition of matter,” the presumption of knowledge would *not* extend to any attribute, quality, utility, or application of the natural subject matter. To be sure, the full § 103 analysis may ultimately conclude that a particular attribute, quality, utility, or application would have been *obvious* to a person of ordinary skill who has knowledge of the subject matter’s existence in nature. But that is an argument to be made, not an automatic presumption to be applied.

Indeed, the foregoing is a key distinction between our proposed § 101 prior-art rule and the Supreme Court’s “inventive concept” test. Beyond the *existence* of subject matter that falls within the § 101 statutory categories but is not “new” to the world, the Court’s “inventive concept” test presumes that a person of ordinary skill in the art has full knowledge of any underlying principle, attribute, quality, or utility that can be characterized as a “law of nature.”⁷⁴⁷ As we have discussed and the Supreme Court has admitted, faithful application of this rule would eviscerate patent law, “because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.”⁷⁴⁸ Moreover, unlike our proposed § 101 prior-art rule, the “inventive concept” test lacks any basis in the statutory text, and it conflicts with the plain language of § 101 that makes “discover[ies]” patent eligible so long as the claimed subject matter falls within the listed statutory categories and is “new” to the world.⁷⁴⁹

We will now provide a series of exemplary applications of the proposed patent-eligibility framework in conjunction with the proposed § 101 prior-art rule. We return first to our hypothetical regarding the Eden tree. Let us consider, for example, a “composition of matter” claim directed solely to Eden tree sap. Applying the proposed framework, such a claim would clearly recite patent-ineligible subject matter under § 101, as Eden tree sap typically exists in nature without human input or intervention and thus is not “new” to the world. Such a “composition of matter” claim would therefore be rendered unpatentable by § 101, making consideration of the § 103 obviousness analysis unnecessary.

747. See *Mayo*, 132 S. Ct. at 1293–94; *Flook*, 43 U.S. at 597.

748. *Mayo*, 132 S. Ct. at 1304 (quoting *Diamond v. Diehr*, 450 U.S. 175, 189 n.12 (1981)).

749. See *supra* Parts V.D–E.

The analysis changes if we instead consider a claim that recites: “A method of harvesting Eden tree sap, comprising the steps of (a) locating an Eden tree, (b) extracting sap from the trunk of said Eden tree, and (c) storing the extracted sap in a sealed receptacle.” The foregoing claim recites a “process” that is “new” to the world, as the claimed process of harvesting Eden tree sap does not typically occur in nature absent human input or intervention. As such, the claim recites patent-eligible subject matter under § 101.

However, while the claimed “method of harvesting Eden tree sap” is patent *eligible* under § 101, the claim must still satisfy the remaining patentability requirements, including the non-obviousness requirement of § 103. Under § 103, a patent may not be obtained if “the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art.”⁷⁵⁰ Our hypothetical presumes that the recited means of harvesting tree sap was well-known in the art at the time of the alleged invention. Further, under the proposed § 101 prior-art rule, because the Eden tree and its sap are both “composition[s] of matter” that are not “new” to the world, they constitute “prior art” for the purpose of the § 103 analysis. Under these circumstances, we believe that a fact finder would likely conclude that a person having ordinary skill in the art would have found it obvious that the known means of harvesting tree sap could be used to harvest sap from the Eden tree, the existence of which is presumed to be well-known. Accordingly, the claimed “method of harvesting Eden tree sap” would likely be found invalid as obvious under § 103.

The analysis changes yet again if, after discovering that sap from the Eden tree is an effective treatment for acne, the patentee claims “[a] method of treating acne by applying Eden tree sap to a person’s skin.” In that scenario, the claimed “process” of treating acne would be “new” to the world, as it does not typically occur in nature absent human input or intervention. Accordingly, such a claim would be patent eligible under § 101.

Turning to the § 103 analysis, the Eden tree sap would again be considered “prior art,” as it is a “composition of matter” that is not “new” to the world. However, while the Eden tree sap’s *existence* would be considered well-known, the prior art would *not* include the

750. 35 U.S.C. § 103 (2012).

knowledge that Eden tree sap *can be used to treat acne*. The relevant question, therefore, would be whether a person having ordinary skill in the art would have found it obvious to use the known substance of Eden tree sap to treat acne. Given that the prior art includes no knowledge that Eden tree sap is effective at treating acne, we believe a fact finder would likely find the claim non-obvious under § 103. Accordingly, unlike the claims directed to Eden tree sap as a “composition of matter” or to a generic “process” of harvesting Eden tree sap, the claimed method of using Eden tree sap to treat acne would be both patent eligible (§ 101) and non-obvious (§ 103).

As described above, if a “composition of matter” or “process” constitutes prior art under § 101 because it is not “new” to the world, then the hypothetical person having ordinary skill in the art is presumed to have knowledge of the subject matter’s existence in nature. It should be noted that knowledge of the subject matter’s existence in nature necessarily includes knowledge of *all locations* in nature where the subject matter can be found.

For example, let us consider a hypothetical scenario in which a patentee was the first to discover that the DNA of an unborn fetus can be found circulating in the maternal bloodstream during pregnancy. Presume the patentee then claimed a “method of detecting fetal DNA in maternal blood” generally comprising the steps of (1) analyzing maternal blood using well-known laboratory tests, and (2) detecting the fetal DNA in the maternal blood. Because fetal DNA is a “composition of matter” that typically exists in nature and thus is not “new” to the world, the fetal DNA itself constitutes § 101 prior art under our proposed rule. As such, a person having ordinary skill in the art would be presumed to have knowledge of the fetal DNA’s existence *and location* in nature—including, specifically, the fact that fetal DNA naturally exists in the maternal bloodstream. Under these circumstances, we believe a fact finder would likely conclude that a person having ordinary skill in the art would have found it obvious that known tests for analyzing blood could be used to detect fetal DNA in maternal blood, given the presumption that the presence of fetal DNA in maternal blood was already well-known. Accordingly, the claimed “method of detecting fetal DNA in maternal blood” would likely be found invalid as obvious under § 103.

While the foregoing examples both concerned “process” claims, the proposed § 101 prior-art rule applies to any type of claim. For example, let us again revisit the facts of *Funk Bros.*, where the patentee claimed an inoculant mixture for plants comprising multiple strains of bacteria that did not inhibit each other’s effects.⁷⁵¹ The Supreme Court found the claimed inoculant mixture patent ineligible under § 101, in part because the individual species of bacteria comprising the mixture were each products of nature.⁷⁵² In contrast, as we described in Part VI.A, *supra*, our proposed framework would find the *Funk Bros.* claim patent eligible under § 101, as the claimed inoculant mixture *as a whole* is a “composition of matter” that is “new” to the world—i.e., the *mixture* of bacteria does not typically exist in nature absent human input or intervention.

But the *Funk Bros.* inoculant mixture must still satisfy the non-obviousness requirement of § 103. Under the proposed § 101 prior-art rule, each of the individual species of bacteria comprising the claimed inoculant mixture would be considered “prior art” for the § 103 analysis, as each bacteria strain is a “composition of matter” that typically exists in nature and thus is not “new” to the world. A person having ordinary skill in the art would thus be presumed to have knowledge of the *existence* of each bacteria strain. But that does not end the inquiry, as the claimed invention must be “considered as a whole” under § 103.⁷⁵³ The relevant question is whether a person of ordinary skill would have found it obvious *to combine* the known bacteria strains to create the claimed inoculant *mixture*. The *Funk Bros.* Court found that, prior to the invention, “it had been assumed that the different [bacteria] species were mutually inhibitive.”⁷⁵⁴ The inventor then “discovered that there are strains of each species of . . . bacteria which do not exert a mutually inhibitive effect on each other.”⁷⁵⁵ In our opinion, without this added knowledge discovered by the inventor (i.e., the qualities of mutual non-inhibition), a person having ordinary skill in the art would not have found it obvious to combine the known species of bacteria to form the claimed mixture. Accordingly, under our proposed patent-eligibility framework and

751. *Funk Bros.*, 333 U.S. at 128–30.

752. *Id.* at 131.

753. 35 U.S.C. § 103.

754. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).

755. *Id.*

prior-art rule, the claimed inoculant mixture would have likely been found both patent eligible (§ 101) and non-obvious (§ 103).

As a final example, we return once again to the facts of *Myriad*, including *Myriad*'s claims directed to synthetically created cDNA. As we discussed in Part VI.A, *supra*, our proposed framework would find that claims which recite cDNA (with one or more intervening introns removed) are patent eligible under § 101, as such claims recite “composition[s] of matter” (i.e., nucleotide sequences) that are “new” to the world (i.e., do not typically exist in the human genome). The *Myriad* Court reached the same conclusion under substantially similar reasoning.⁷⁵⁶ However, although the *Myriad* Court found that such cDNA claims were patent eligible under § 101, it “express[ed] no opinion [as to] whether cDNA satisfies the other statutory requirements of patentability,” such as obviousness under § 103.⁷⁵⁷

The genome of a natural organism typically comprises one or more discrete chromosomes, wherein each chromosome is encoded with a sequence of millions of chemically joined nucleotide pairs.⁷⁵⁸ Each chromosome is a “composition of matter” that typically exists in nature and thus is not “new” to the world. As such, under the proposed § 101 prior-art rule, every chromosome that exists in nature—including its entire nucleotide sequence—constitutes “prior art” for the purposes of a § 103 analysis. This means that a person of ordinary skill in the art would be presumed to have knowledge of the existence and location—i.e., the sequence—of all nucleotides in every chromosome of the natural organism's genome. The corresponding implications for the obviousness inquiry will likely depend on the specific limitations recited in the claim at issue.

For example, consider a hypothetical “composition of matter” claim directed to cDNA derived from the *full* nucleotide sequence of a chromosome. In other words, presume that the claim recites cDNA comprising all exons from the entire chromosome, with all of the introns removed. Under the proposed § 101 prior-art rule, the full nucleotide sequence of the chromosome used to create the cDNA would be considered “prior art” for the § 103 analysis. Further, as the Supreme Court noted in *Myriad*, the prior art also includes “well

756. *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2119 (2013).

757. *Id.* at 2119 n.9 (“We express no opinion whether cDNA satisfies the other statutory requirements of patentability. *See, e.g.*, 35 U.S.C. §§ 102, 103, and 112 . . .”).

758. *Id.* at 2111, 2114.

known laboratory methods” for deriving cDNA from natural DNA.⁷⁵⁹ Under these circumstances, we believe a fact finder would likely conclude that a person of ordinary skill in the art would have found it obvious that the known laboratory methods could be used to derive cDNA from the known nucleotide sequence of the chromosome. Thus, the hypothetical claim directed to cDNA derived from an entire natural chromosome would likely be invalid as obvious under § 103.

The analysis changes, however, if we consider a “composition of matter” claim that recites cDNA derived from a *specific subset* of a chromosome’s nucleotide sequence. For example, Myriad discovered that a subset of the nucleotides located within chromosome 17 (the BRCA1 sequence) can be used to predict a patient’s cancer risk.⁷⁶⁰ Claim 2 of Myriad’s patent thus recited cDNA derived from the BRCA1 sequence.⁷⁶¹ Under the proposed § 101 prior-art rule, the entire nucleotide sequence of chromosome 17 would be considered “prior art” for the § 103 analysis. What would *not* be prior art, however, is the knowledge that the BRCA1 subset of chromosome 17 has a unique *utility* for predicting cancer risk. But a patent claim which recites a “composition of matter” is not limited to any specific utility. Thus, the relevant question for the § 103 analysis is whether a person of ordinary skill would have found it obvious to use known laboratory methods to create cDNA from the BRCA1 subset of chromosome 17’s known nucleotide sequence, *notwithstanding* that the BRCA1 subset’s utility for predicting cancer risk was previously unknown.

For such claims, the Federal Circuit has held that a “*prima facie* case of obviousness” may be established if there is “structural similarity” to the prior art and a “motivation to make the claimed composition[.]”—i.e., a motivation aside from the newfound utility.⁷⁶² The burden then shifts to the patentee to “rebut that *prima facie* case,” for example, by showing “that the prior art is so deficient that there is no motivation to make what might otherwise appear to be obvious.”⁷⁶³ The discovery of “unexpectedly improved properties

759. *Id.* at 2112.

760. *Id.* at 2110–11.

761. *Id.* at 2113.

762. *In re Dillon*, 919 F.2d 688, 692 (Fed. Cir. 1990) (en banc).

763. *Id.* at 693.

or properties that the prior art does not have” is evidence of non-obviousness, but “does not *by itself* defeat a *prima facie* case.”⁷⁶⁴ Ultimately, analyzing Claim 2 of Myriad’s patent for obviousness will be a fact-intensive inquiry that is beyond the scope of this Article.⁷⁶⁵ But whatever the outcome, the important point is that the § 103 analysis of the claimed subject matter—cDNA derived from the BRCA1 sequence—should proceed based upon the view that the natural nucleotide sequence of chromosome 17 is “prior art.”

Finally, the analysis changes once again if—rather than a “composition of matter”—we instead consider a claimed “process” of using the BRCA1 sequence to test patients for an increased risk of cancer. Such a claim would recite patent-eligible subject matter under § 101, as the claimed “process” of using BRCA1 to assess a patient’s cancer risk is clearly “new” to the world—i.e., the process does not typically occur in nature without human input or intervention.

Turning to the obviousness inquiry, the nucleotide sequence of chromosome 17—which includes the BRCA1 sequence—would again be considered “prior art” for the § 103 analysis, as it is a “composition of matter” that is not “new” to the world. However, while the sequence’s *existence* would be considered well-known, the prior art would *not* include knowledge that the BRCA1 sequence can be used to assess cancer risk. Moreover, unlike a “composition of matter” claim, the claimed “process” is tied to a specific utility—i.e., assessing cancer risk. As such, the relevant question for the § 103 analysis is whether a person of ordinary skill in the art would have found it obvious to use the BRCA1 subset of chromosome 17’s known nucleotide sequence to test patients for increased cancer risk. Given that the prior art includes no knowledge that the BRCA1 sequence can be used to assess cancer risk, we believe a fact finder would likely find the claimed process non-obvious under § 103. Accordingly, a claimed “process” of using the BRCA1 sequence to test patients for increased cancer risk would be both patent eligible (§ 101) and non-obvious (§ 103) under our proposed framework.

764. *Id.* at 692–93 (emphasis added).

765. *Id.* at 693 (“Each situation must be considered on its own facts . . .”); *see generally* *Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280 (Fed. Cir. 2012) (analyzing obviousness of a pharmaceutical composition); *Genetics Inst., LLC v. Novartis Vaccines & Diagnostics, Inc.*, 655 F.3d 1291 (Fed. Cir. 2011) (analyzing obviousness of a human blood-clotting protein).

Indeed, this result should be unsurprising—the *Myriad* Court expressly noted that “this case does not involve [claims] on new *applications of knowledge* about the BRCA1” sequence, and “[m]any of [the] unchallenged claims are limited to such applications.”⁷⁶⁶

VII. CONCLUSION

As we have endeavored to demonstrate in this Article, prior to *Myriad*, the Supreme Court’s patent-eligibility jurisprudence was deeply flawed. The Court’s judicially created exceptions to patent-eligible subject matter lack any support in the statutory text, are based on misinterpretations of the Court’s own precedents, and rely upon subjective determinations that have proved thoroughly confounding for lower courts to apply. Further, the judicial exceptions have been prompted by concerns that Congress has already addressed in other explicit provisions of the patent laws, including but not limited to the requirements of non-obviousness,⁷⁶⁷ full-scope enablement,⁷⁶⁸ written description,⁷⁶⁹ and claim definiteness.⁷⁷⁰ We submit that these other provisions should be allowed to do their work as Congress intended, while the patent-eligibility inquiry should be limited to a role firmly grounded in the plain language of § 101. We have accordingly proposed a new framework for the patent-eligibility inquiry that takes its cues from *Myriad* and abandons the dominant frameworks of the Supreme Court’s pre-*Myriad* case law.

Under our proposed framework, and consistent with the text of § 101, a claim recites patent-eligible subject matter if and only if (1) the claim as a whole literally recites a “process, machine, manufacture, or composition of matter,” and (2) the claimed subject matter as a whole is “new” to the world.⁷⁷¹ For this analysis, the claimed subject matter is “new” to the world if and only if it does not typically exist or occur in nature absent human input or intervention.

766. *Myriad*, 133 S. Ct. at 2120 (emphasis altered); *see also id.* at 2113 n.2 (“At issue are claims 1, 2, 5, 6, and 7 of U.S. Patent 5,747,282”); U.S. Patent No. 5,747,282 claim 20 (filed June 7, 1995) (unchallenged claim 20 reciting “[a] method for screening potential cancer therapeutics”).

767. 35 U.S.C. § 103 (2012).

768. 35 U.S.C. § 112(a) (2012).

769. *Id.*

770. 35 U.S.C. § 112(b) (2012).

771. 35 U.S.C. § 101 (2012).

Finally, to close the circle and preserve that which is rightfully in the public domain, any “process, machine, manufacture, or composition of matter” that is *not* “new” to the world constitutes § 101 “prior art,” which may be cited in a typical § 103 obviousness analysis.

The framework we have proposed maintains the long-standing prohibition against patenting products of nature—consistent with the statutory text—while providing a bright-line rule that will bring much-needed predictability and consistency to the § 101 inquiry. The framework reserves for other, better-suited provisions of the patent laws the more granular balancing of interests required to determine whether a particular claimed invention warrants patent protection. Finally, we emphasize that the proposed framework set forth in this Article would require changes to prevailing law—including the express overruling of a number of Supreme Court precedents—which of course only the Supreme Court or Congress have the power to do.