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Patents 101: Patentable Subject Matter and Separation of Powers

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Patents 101: Patentable Subject Matter and Separation of Powers

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ABSTRACT

The definition of statutory subject matter lies at the heart of the patent system. It is the reflection of Congress's policy decision as to what types of inventions one may patent. While the congressional definition of statutory subject matter (in what is now 35 U.S.C. § 101) has remained fundamentally constant since 1790, the Supreme Court has reinterpreted and redefined statutory subject matter several times, leaving lower courts with the frustrating task of trying to develop a coherent jurisprudence against a changing landscape. This inconstancy has introduced uncertainty for inventors who are trying to make the fundamental decision of whether to maintain a trade secret or seek patent protection for an innovation. Notwithstanding repeated admonitions to the lower courts not to read words into the patent statute, the Supreme Court itself has created three exceptions to the categories of statutory subject matter established by the clear words of § 101: laws of nature, physical phenomena, and abstract ideas. This intervention would be defensible if it were constitutionally required or if the statutory language were ambiguous, but neither is the case. In fact, the Court's particular intervention is counter to the constitutional mandate to promote progress. In certain cases, this disincentive may be sufficient to prevent promising new technologies from ever developing. This Article proposes that Congress should consider the judicially created exceptions to the statutory categories of patentable subject matter and amend the statute so as to end judicial intrusion into patent policymaking.

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Congress has just completed a major overhaul of the US patent statute, reversing the fundamental definition of inventorship that dated back to 1790, but leaving in place a provision that nearly prevented the emergence of the computer and biotech industries, and that threatens the future of emerging technologies such as nanotechnology.¹ The scope of “statutory subject matter” has eluded

1. See Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (“[C]onverting the United States patent system from ‘first to invent’ to a system of ‘first inventor to file’”) (amending 35 U.S.C. § 100(o) (2006)); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

definition.² While the language of 35 U.S.C. § 101 has remained fundamentally constant since 1790, the Supreme Court has reinterpreted and redefined it several times since the Court's first foray into the subject in 1853.³ This judicial inconstancy has left lower courts with the frustrating task of trying to develop a coherent jurisprudence against a changing landscape. Furthermore, this inconstancy has introduced uncertainty for inventors who are trying to make the fundamental decision of whether to maintain a trade secret or seek patent protection⁴ for an innovation.⁵

The current patent statute conditions the grant of a patent on meeting several criteria. An applicant must file a written application with the United States Patent and Trademark Office (USPTO),⁶ which reviews the application⁷ to determine whether the claimed invention⁸:

2. 35 U.S.C. § 101 lists four categories of "statutory subject matter" that may be patented: machines, manufactures, compositions of matter, and processes. 35 U.S.C. § 101 (2006). These are the only types of inventions that may be patented. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974) ("[N]o patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101 . . .").

3. *See, e.g., Diehr*, 450 U.S. at 185.

4. *See id.* There are three types of patents—utility patents granted for new and useful processes, machines, manufactures, and compositions of matter, 35 U.S.C. §101; design patents granted for novel ornamental designs, 35 U.S.C. § 171; and plant patents granted for distinct and new varieties of plants (other than tubers) that have been asexually reproduced, 35 U.S.C. § 161. The issues discussed in this article arise only with respect to utility patents.

5. *See id.; Kewanee*, 416 U.S. at 489-90 (comparing the protection afforded by trade secret and patent systems). The Uniform Trade Secrets Act defines a trade secret as:

[I]nformation . . . that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

Unif. Trade Secrets Act § 1(4) (amended 1985). Under the Uniform Trade Secrets Act, misappropriation of trade secrets—generally, disclosure or use of a trade secret that has been obtained from the owner by improper means—gives rise to damages and the possibility of injunctive relief. Unif. Trade Secrets Act § 1(2), §§ 2-3 (1985). Under the patent system, manufacture, use, sale, or importation of a product incorporating a patented invention—whether obtained from the owner or independently developed—gives rise to damages and the possibility of injunctive relief. *See* 35 U.S.C. §§ 283-84 (2006). Thus, the patent system may be viewed as a mechanism for inducing the holders of trade secrets to disclose them (and therefore surrender protection under trade secret law) in exchange for a limited-term, but broader scope, monopoly over certain applications of the trade secrets. *See Kewanee*, 416 U.S. at 489-90; *Painton & Co. v. Bourns, Inc.*, 442 F.2d 216 (2d Cir. 1971).

6. 35 U.S.C. § 111(a)(1).

7. *Id.* § 131.

8. A patent application must contain at least one claim that defines "the subject matter which the applicant regards as his invention." *Id.* § 112.

- (1) is statutory subject matter, i.e., a machine, manufacture, composition of matter, or process;⁹
- (2) is useful;¹⁰
- (3) is novel;¹¹
- (4) would not be considered obvious by a hypothetical person of ordinary skill in the field;¹² and
- (5) is described well enough that those in the field can make and use the invention.¹³

The USPTO will issue a patent only for claims it determines satisfy the statutory requirements, and a challenge to an issued patent will succeed if the challenger can show that any of these requirements have not been met.¹⁴ A court faced with a patent challenge can invalidate a patent on any of the above grounds.

The definition of statutory subject matter lies at the heart of the patent system. It is the reflection of Congress's policy decision as to what types of inventions one may patent. The Supreme Court has held Congress's power plenary,¹⁵ and this policy decision is given great judicial deference. Indeed, as the name implies, it is "statutory."¹⁶

Notwithstanding repeated admonitions to the lower courts not to read words into the patent statute,¹⁷ the Court itself has created three exceptions to the categories of statutory subject matter established by the clear words of § 101: laws of nature, physical phenomena, and abstract ideas.¹⁸ Those three exceptions are the root cause of the difficulties in defining the scope of statutory subject matter and arguably have delayed the development of the software,

9. *Id.* § 101; *see also supra* note 2.

10. 35 U.S.C. § 101. The Patent Office interprets § 101 to require that the claimed invention have a "specific, substantial, and credible" use. U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 2107(II) (8th ed. Rev. 8, 2010).

11. 35 U.S.C. §§ 101-102.

12. *Id.* § 103.

13. *Id.* § 112.

14. *Id.* §§ 101, 131, 151, 282.

15. *See McClurg v. Kingsland*, 42 U.S. 202, 206 (1843) ("[T]he powers of Congress to legislate upon the subject of patents is plenary by the terms of the Constitution . . ."). For two copyright cases confirming the scope of Congress's power under the Intellectual Property Clause, which governs both patents and copyrights, *see Golan v. Holder*, 132 S. Ct. 873 (2012) (upholding a statute restoring copyrights to works which had fallen into the public domain) and *Eldred v. Ashcroft*, 537 U.S. 186 (2003).

16. *See* 35 U.S.C. § 101; *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974).

17. The Supreme Court has "more than once cautioned that courts should not read into the patent laws limitations and conditions which the legislature has not expressed." *Diamond v. Diehr*, 450 U.S. 175, 182 (1981) (citations omitted).

18. *Diehr*, 450 U.S. at 188; *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

biotech, and nanotechnology industries.¹⁹ This intervention would be defensible if it were constitutionally required, but that is not the case. In fact, the Court's particular intervention is counter to the constitutional mandate to promote progress; withdrawing patent protection withdraws the incentive to disclose. The net result of the Court's efforts to circumscribe patentable subject matter is to deprive inventors of patents they deserve, and to invite infringement of what should be valid patents, thereby providing a disincentive to invent. In certain cases, this disincentive may be sufficient to prevent promising new technologies from ever developing. The Court has neither cited evidence nor offered a rationale for concluding that what it perceives as the cost of overly-broad protection outweighs the cost of losing a technology entirely.

This Article proposes that Congress should consider the judicially created exceptions to the statutory categories of patentable subject matter and revise the statutory definition. Part I traces the history of the statutory language and judicial interpretation, showing constancy in the statute but the lack of a consistent judicial theory supporting the exceptions. Part II examines the arguments conceptually justifying limits on statutory subject matter. Part III examines the two possible bases for judicial intervention: intervention based on constitutional mandate and intervention based on interpretation of an ambiguous statute. Concluding that intervention is not constitutionally mandated and the statute is unambiguous, Part IV reviews the costs and benefits of maintaining the uncertainty resulting from the judicially created exceptions, and Part V proposes that Congress amend the statute so as to end judicial intrusion into patent policymaking.

I. A BRIEF HISTORY OF STATUTORY SUBJECT MATTER

A. Why Statutory Subject Matter?

Given the difficulties and uncertainty surrounding statutory subject matter, it is reasonable to ask why the requirement exists in the first place. Why should only certain types of discoveries be patentable? A simplistic, although sufficient, answer is "because Congress decided to impose it and the Constitution gave Congress that power." The Supreme Court has consistently held that "the power of Congress to legislate upon the subject of patents is plenary by the terms of the Constitution, and . . . there are no restraints on its

19. Joshua Sarnoff, *Patent-Eligible Inventions after Bilski: History and Theory*, 63 HASTINGS L.J. 53, 59-60 (2011).

exercise.”²⁰ Courts have been extremely deferential to the terms that Congress sets.²¹

To understand why Congress might limit patent protection to certain categories of invention, a brief review of the origins and an overview of the rules of patents will be helpful.

Patents are government-sanctioned monopolies.²² While early English patents were awarded as royal favors,²³ the US patent system finds antecedents in the English Statute of Monopolies of 1624,²⁴ which was Parliament’s reaction to the royal favor system.²⁵ Modern patent systems grant monopolies for “things which are worth to the public the embarrassment of an exclusive patent.”²⁶

Thus, an optimal patent system would grant patents for innovations in a manner that generates maximum scientific progress. Unfortunately, it would be impossible to reach universal agreement on which system would fit that model of optimality;²⁷ fortunately, the US Constitution does not require optimality. Article I, Section 8 establishes the constitutional basis for the US patent system, providing that:

20. McClurg v. Kingsland, 42 U.S. 202, 206 (1843); Sarnoff, *supra* note 19, at 67.

21. Congress has changed the term of patent protection several times, most recently changing the term from seventeen years from the date of issue to twenty years from the date of application, see 35 U.S.C. § 154, and no challenge to its authority to do so has ever reached the appellate level. In assessing congressional power over copyrights, the other right created by the Intellectual Property Clause, the Court held the extension of copyright protection for works already in existence constitutional over a vigorous dissent in which Justice Breyer demonstrated that the term was nearly unlimited from a discounted cash perspective. Eldred v. Ashcroft, 537 U.S. 186, 256-57 (2003) (Breyer, J., dissenting).

22. During its term, a US patent gives its owner the right to stop others from making, using, selling, or importing the patented invention. 35 U.S.C. § 154(a)(1). Violation of these rights constitutes infringement and gives rise to damages and, subject to equitable considerations, injunctions. *Id.* §§ 283-284.

23. Statute of Monopolies, 1624, 22 Jac., c. 3, § 6 (Eng.); Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1, 12 (1994) (noting that the first patent statute was written against the “backdrop” of English monopoly practices).

24. Pennock v. Dialogue, 27 U.S. (2 Pet.) 1, 17, 18 (1829).

25. Statute of Monopolies, 1624, 22 Jac., c. 3, § 6 (Eng.); Walterscheid, *supra* note 23.

26. Letter from Thomas Jefferson, Former US President, to Isaac McPherson (Aug. 13, 1813) (available at <http://hdl.loc.gov/loc.mss/mtj.mtjbib020976>).

27. Aaron J. Zakem, Note, *Rethinking Patentable Subject Matter: Are Statutory Categories Useful?*, 30 CARDOZO L. REV. 2983, 2988 (2009) (“[I]t has proven difficult to draw an exclusionary line which disallows inhibitive patents without prejudicing claims on novel and non-obvious technology, where such analysis is based solely on attempts to categorize all inventions as either a ‘process, machine, manufacture or composition of matter.’”). Compare Sarnoff, *supra* note 19, at 57 (“[T]he patent system is not supposed to reward discoveries of basic science”), with Peter Lee, Note, *Patents, Paradigm Shifts and Progress in Biomedical Science*, 114 YALE L.J. 659, 690-91 (2004) (suggesting that strong patent rights induce hypothesis generation and develop new scientific paradigms).

The Congress shall have 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.²⁸

The fundamental goal of the patent system is to provide an adequate incentive to motivate innovators to give up trade secret rights in their innovation.²⁹ In theory, disclosure of a trade secret benefits society more broadly than does maintaining a trade secret since it permits more people to make use of the information as a starting point for further innovation, thereby opening the door to competition.³⁰

Since the patent statute is designed to promote technological progress through the incentive of a limited-term monopoly in exchange for disclosure of what could otherwise be maintained as a trade secret, the choice of requirements for patentability influences the type of innovation that the statute promotes.³¹ The statute does not incentivize categories of inventions that it excludes from patentability and therefore inventors are less likely to develop and disclose those categories of inventions. The choice is one of policy and Congress should make it, subject to constitutional constraints.

In drafting and revising the patent statute, Congress has received little guidance from the records of the Constitutional Convention.³² The very existence of the Intellectual Property Clause is curious; it is one of the more specific powers in a document otherwise given to broad principles.³³ The records of the Convention

28. U.S. CONST. art. I, § 8, cl. 8.

29. The Uniform Trade Secrets Act defines a “trade secret” as:

[I]nformation . . . that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

Unif. Trade Secrets Act § 1(4) (amended 1985). Issued patents are published and available at the Patent Office, and a full text database is also available online, which is updated weekly. See U. S. PAT. & TRADEMARK OFF., (Sept. 2, 2012, 10:48 PM), www.uspto.gov. Publication of a patent destroys the associated trade secrets by two mechanisms: it makes them generally known and it is a failure to make reasonable efforts to maintain their secrecy. See Unif. Trade Secrets Act § 1 (amended 1985).

30. *Kewanee Oil Co. v. Bicon Corp.*, 416 U.S. 470, 493 (1974) (Marshall, J., concurring).

31. 35 U.S.C. § 101 (2006); *Kewanee*, 416 U.S. at 483.

32. For a detailed history of how the clause was drafted and adopted, see Walterscheid, *supra* note 23, at 1-56. See also 2 RECORDS OF THE FEDERAL CONVENTION 325, 322 (Max Farrand ed., rev. ed. 1966).

33. As Walterscheid points out:

In the draught of a fundamental constitution, two things deserve attention: 1. To insert essential principles only, lest the operations of government should be clogged by rendering those provisions permanent and unalterable, which ought to be accommodated to times and events. . . . 2. To use simple and precise language, and general propositions

and the ratification debates are virtually silent on the subject.³⁴ The full Convention adopted the Intellectual Property Clause without debate and with little record of committee deliberations.³⁵ The patent language, in particular, appears to have been added in committee with no record of who made the addition or why.³⁶ Guided only by the language of the Clause itself, courts have placed few restrictions on Congress, the principle restriction being that the patent power is a “qualified authority . . . limited to the promotion of advances in the ‘useful arts.’”³⁷

The system Congress created provides a delicate balance. The patent statute promotes technological progress through the monopoly it offers for the creation and disclosure of something new.³⁸ In exchange, the innovator must provide a description of how to make and use the invention so that, once the patent expires, the public has

Walterscheid, *supra* note 23, at 2.

34. See generally Walterscheid, *supra* note 23, at 31-34; cases collected in Max Stul Oppenheimer, *Harmonization Through Condemnation: Is New London the Key to World Patent Harmony?*, 40 VAND. J. TRANSNAT'L L. 445 (2007).

35. Edward C. Walterscheid, *Inherent or Created Rights: Early Views on the Intellectual Property Clause*, 19 HAMLINE L. REV. 81, 92 (1995) (“No delegate to the Constitutional Convention has left any record concerning the interpretation or meaning placed on the Intellectual Property Clause by the delegates themselves.”).

36. Walterscheid, *supra* note 23, at 26, 51 (“There is no record to indicate how the intellectual property proposals submitted by Madison and Pinckney were transformed into this clause.”). There are a number of possible explanations for this lack of debate: (1) support for patent rights was universal so there was nothing to debate, Sidney A. Diamond, *Our Patent System: The Past is Prologue*, 62 J. PAT. OFF. SOC'Y 437, 440 (1980) (“The delegates clearly believed firmly that it was in the public interest to establish a patent and copyright system.”); (2) patents were so unimportant that no one cared, Walterscheid, *supra* note 23, at 16 (“One indication of the relatively low value attached to patents is the fact that no record has been found of any litigation involving colonial patents of monopoly for invention in any colonial or English court.”); and (3) the Convention had more important issues to resolve and limited time:

The absence of debate over the patent provision . . . has been taken as proof of their firm belief in patents as the best way to encourage socially beneficial innovation. However, it is more likely that the authors of the Constitution simply followed the English precedent and chose the patent without paying much attention to the subject, since they were also faced with the larger problems of how to structure the government, solve its fiscal difficulties, and defend the new nation.

Morgan Sherwood, *The Origins and Development of the American Patent System*, 71 AM. SCI. 500, 500 (1983). It is also possible “that the delegates were tired [and] wanted to go home . . .” Walterscheid, *supra* note 23, at 26, 51.

37. *Graham v. John Deere Co.*, 383 U.S. 1, 5 (1966); see also *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007) (reaffirming that patents are designed to promote “the progress of useful arts”); *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917) (“[T]he primary purpose of our patent laws is not the creation of private fortunes for the owners of patents, but is to promote the progress of science and useful arts . . .”).

38. 35 U.S.C. § 102 denies patentability to ideas that are already public, while § 103 denies patentability to obvious advances. §§ 102-103 (2006). “Inventions” must be truly inventive and not merely obvious improvements on existing knowledge. *Id.* § 103; *Graham*, 383 U.S. at 6; *Hotchkiss v. Greenwood*, 52 U.S. (11 How.) 248, 267 (1850).

the information necessary to make and use the invention.³⁹ In contrast, inventors can often profit from their work while keeping the invention confidential and relying on trade secret protection,⁴⁰ rather than making the invention public.⁴¹ For example, if an inventor develops a more efficient process for manufacturing an item, the inventor may be able to keep the process secret and profit by undercutting the price of competitors who must use the less efficient, publicly available process to manufacture the item.⁴²

Public commercialization can irrevocably surrender a trade secret.⁴³ Even such paradigmatic trade secrets as the recipe for Coke or Kentucky Fried Chicken are subject to discovery by reverse engineering.⁴⁴ Without the protection of patent law, competitors who learn the secret by proper means⁴⁵ can make use of it without having spent the time and money to develop it. In economic terms, this gives the competitor an advantage over the innovator in pricing because the competitor does not need to recover research and development costs.⁴⁶

39. 35 U.S.C. § 112 (“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 . . .”).

40. As long as the requirements for trade secrecy (valuable confidential information as to which reasonable steps are taken to maintain its confidentiality) are met, a trade secret may be maintained—in theory, indefinitely, but a public disclosure of the trade secret would destroy it. Unif. Trade Secrets Act §§ 1(4), 2 (amended 1985).

41. 35 U.S.C. § 112.

42. Jefferson is frequently cited for his observation that “[h]e who receives an idea from me, receives instructions himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.” Letter from Thomas Jefferson, Former US President, to Isaac McPherson (Aug. 13, 1813) (available at <http://hdl.loc.gov/loc.mss/mtj.mtjbib020976>). “This observation was clearly a lapse of economic judgment for the sake of rhetoric. The basis of trade secret law is that there is economic value in keeping competitors in the dark.” Max Stul Oppenheimer, *In Vento Scribere: The Intersection of Cyberspace and Patent Law*, 51 FLA. L. REV. 229, 236 n.20 (1999).

43. Unif. Trade Secrets Act § 1 cmt. (amended 1985). As Thomas Jefferson observed:

If nature has made any one thing less susceptible than all others of exclusive property, it is . . . an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one [sic] . . .

Letter from Thomas Jefferson, Former U.S. President, to Isaac McPherson (Aug. 13, 1813) (available at <http://hdl.loc.gov/loc.mss/mtj.mtjbib020976>).

44. Unif. Trade Secrets Act § 1 cmt. Of course, a competitor who reverse engineered the formula would still face the task of convincing consumers that it had successfully done so. As of the date of publication of this Article, the recipes for Coke and Kentucky Fried Chicken remain protected trade secrets.

45. The Uniform Trade Secrets Act prohibits acquisition by improper means. Misappropriation may be enjoined or give rise to damages. *Id.* §§ 2(a), 3(a). Misappropriation is defined as “acquisition of a trade secret of another by a person who knows or has reason to know that the trade secret was acquired by improper means.” *Id.* § 1(2)(i).

46. *Id.* § 3 cmt.

The prospect of a competitor using the same innovation at a lower cost reduces the incentive to innovate.⁴⁷

A patent gives its owner the right to prevent competitors from making, using, selling, or importing the patented invention for a period starting on the date the USPTO issues the patent,⁴⁸ and ending twenty years after the date the owner files the patent application.⁴⁹ An infringer of these rights is liable for damages that are to be no less than a reasonable royalty.⁵⁰ Courts may also enjoin infringements⁵¹ and may award attorney fees in certain cases.⁵² Thus, by providing the right to exclude competitors from the use of the innovation for a limited term, the patent statute may be viewed as an incentive for innovators to share their ideas.⁵³

It is important to recognize that “[t]he patent laws attempt to reconcile this Nation’s deep-seated antipathy to monopolies with the need to encourage progress,”⁵⁴ and that Congress designed the patent statute to encourage some, but not all, innovation. Congress designed certain sections of the statute to ensure that what an applicant seeks to patent is, in fact, innovative and “worth the embarrassment” of granting a patent.⁵⁵ Under 35 U.S.C. § 111, patent applications must be submitted in writing, and under 35 U.S.C. § 112, the application must be detailed enough to demonstrate that the applicant has possession of enough data to describe the invention and how to make

47. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 486 (1974).

48. 35 U.S.C. § 154(a)(1) (2006).

49. *Id.* § 154(a)(2). Some patent terms are subject to adjustment in certain circumstances related to delays in processing by the Patent Office. *Id.* § 154(b).

50. *Id.* § 284.

51. *Id.* § 283. In *eBay, Inc., v. MercExchange, L.L.C.*, 547 U.S. 388 (2006), the Court held that even in patent cases, a court must apply the traditional equitable four-factor test in deciding whether it is appropriate to issue an injunction. *Id.* at 391.

52. 35 U.S.C. § 285.

53. Some inventions lend themselves to commercialization without surrendering trade secrecy. *Kewanee*, 416 U.S. at 477-78. For example, a machine that makes it cheaper to produce an end product may be kept as a trade secret while the inventor profits by sale of the end product. Most states recognize reverse engineering of a publicly sold product as beyond the protection of trade secret law. *See, e.g., id.* at 476. Thus, products that reveal the secret are difficult to commercialize while maintaining trade secrecy, and, for this reason, works of authorship are often difficult to commercialize while maintaining trade secrecy. Computer software, however, is a large commercially valuable class of works of authorship that may be commercialized publicly, protected by copyright and maintained as a trade secret by releasing executable code only, or by marketing services performed using the software rather than the software itself. “Cloud computing” utilizes this business model.

54. *Diamond v. Chakrabarty*, 447 U.S. 303, 319 (1980) (Brennan, J., dissenting); *see also Graham v. John Deere Co.*, 383 U.S. 1, 7-10 (1966).

55. Letter from Thomas Jefferson, Former US President, to Isaac McPherson (Aug. 13, 1813) (available at <http://hdl.loc.gov/loc.mss/mtj.mtjbib020976>); *see also* 35 U.S.C. § 101.

and use it.⁵⁶ Under 35 U.S.C. § 102, the application must demonstrate novelty, while 35 U.S.C. § 103 requires non-obviousness.⁵⁷ These requirements are technology neutral; they apply to any claimed invention and are not intended to preclude patentability of specific types of inventions.⁵⁸ In addition to the statute's generally applicable novelty, non-obviousness, and enablement requirements, Congress specifically restricted patentability to four categories of statutory subject matter, and excluded certain types of inventions from patentability.⁵⁹ The technology-specific statutory exclusions shed little light on the dividing line between patentable subject matter and unpatentable discoveries.⁶⁰ These exclusions share no common theoretical basis—they are simply examples of case-by-case lobbying power.

B. Evolution of the Statute

The current patent statute sets several hurdles for patentability.⁶¹ The Federal Circuit views § 101 as a gatekeeper,⁶² restricting the grant of patents to just four—and only four⁶³—categories of invention: processes, machines, manufactures, and compositions of matter.⁶⁴

The “statutory subject matter” language of the current statute is virtually unchanged from that of the first patent statute, enacted in 1790.⁶⁵ The first patent statute provided for patenting of “any useful art, manufacture, engine, machine, or device, or any improvement

56. 35 U.S.C. §§ 102-103, 111-112.

57. *Id.*

58. *Id.* § 101.

59. 35 U.S.C. §§ 101-103, 111.

60. 13 U.S.C. § 151; Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (amending 35 U.S.C.). Although theoretically patentable, medical procedures are, in effect, not worth patenting as Congress has denied remedies for infringement of such patents. 35 U.S.C. § 287(c)(1).

61. As discussed in Part I.A, *supra*, an invention must be useful, novel, and nonobvious in order to be patentable, and the applicant for a patent must supply a written description of the invention sufficient to teach others how to make and use it. 35 U.S.C. §§ 102-103, 112.

62. *In re Comiskey*, 499 F.3d 1365, 1371 (Fed. Cir. 2007); *State St. Bank & Trust Co. v. Signature Fin. Grp., Inc.*, 149 F.3d 1368, 1372 n.2 (Fed. Cir. 1998) (finding § 101 to be a threshold issue that must be addressed before other questions of patentability); *In re Bergy*, 596 F.2d 952, 960 (C.C.P.A. 1979) (“The first door which must be opened on the difficult path to patentability is § 101.”).

63. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 486 (1974) (“No patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101.”).

64. 35 U.S.C. § 101.

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

therein not before known or used,”⁶⁶ if a majority of a board composed of the Secretary of State (then Thomas Jefferson), the Secretary of War (then Henry Knox), and the Attorney General (then Edmund Randolph) considered “the invention or discovery sufficiently useful and important.”⁶⁷

The second patent statute, enacted in 1793,⁶⁸ explicitly added the term “composition of matter” to the list of statutory subject matter.⁶⁹ The 1793 definition of “statutory subject matter” remained unchanged until 1952,⁷⁰ when Congress amended what would later become § 101 by replacing the word “art” with “process,” and providing a definition of the term “process” in § 100(b).⁷¹ The Supreme Court

66. *Id.*

67. Section 1 of the statute provided:

That upon the petition of any person or persons to the Secretary of State, the Secretary for the department of war, and the Attorney General of the United States, setting forth, that he, she, or they, hath or have invented or discovered any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used . . . it shall and may be lawful to and for the Secretary of State, the Secretary for the department of war, and the Attorney General, or any two of them, if they shall deem the invention or discovery sufficiently useful and important, to cause letters patent to be made out in the name of the United States, to bear test[s] by the President of the United States, reciting the allegations and suggestions of the said petition, and describing the said invention or discovery, clearly, truly and fully, and thereupon granting to such petitioner . . . for any term not exceeding fourteen years, the sole and exclusive right and liberty of making, constructing, using and vending to others to be used, the said invention or discovery

Id. at 109-10.

68. Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 318-19 (repealed 1836). “This bill was probably one written by Thomas Jefferson himself” P.J. Federico, *The Patent Act of 1793*, 18 J. PAT. OFF. SOC’Y 77, 77 (SPECIAL ISSUE), (1936). The Court in *Graham v. John Deere Co.*, 383 U.S. 1 (1966) characterizes Jefferson as the “moving spirit” of the patent statute and the author of the 1793 Act. *Id.* at 7.

69. The 1793 statute provided:

That when any person . . . being a citizen . . . of the United States, shall allege that he . . . [has] invented any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter, not known or used before the application, and shall present a petition to the Secretary of State, . . . it shall and may be lawful for the said Secretary of State, to cause letters patent to be made out

Act of Feb. 21, 1793, ch. 11, 1 Stat. 318-20 (repealed 1836).

70. Congress amended the patent statute in 1836, but the amendment did not affect the definition of statutory subject matter. Patent Act of 1836 § 6, 5 Stat. 117, 119. The 1836 amendments were largely directed to eliminating abuses under the 1793 system, which allowed patents to be issued “without any examination into the merit or novelty of the invention” thereby producing a large number of patents that were “worthless and void, as conflicting with, and infringing upon one another, or upon public rights not subject to patent privileges; arising either from a want of due attention to the specifications of claim, or from the ignorance of the patentees of the state of the arts” and “a great number of lawsuits . . . onerous to the courts, ruinous to the parties, and injurious to society” S. REP. 24-239, at 3-4 (1839). The 1836 statute established a Patent Office within the Department of State to review applications to determine patentability prior to issue. Patent Act of 1836 § 6.

71. 35 U.S.C. § 100(b) (2006); *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

has made clear that neither change was substantive.⁷² In the most recent overhaul of the patent statute, Congress left the definition of “statutory subject” matter unchanged.⁷³ Thus, the current statutory language differs from the original language in only two respects: the addition of the category “composition of matter” in 1793 and the change from “art” to “process” in 1952, both of which courts have held to be non-substantive.⁷⁴

C. Evolution of Supreme Court Interpretation of “Statutory Subject Matter”

While the Congressional definition of “statutory subject matter” has remained fundamentally constant since the founding of the Republic, and the Supreme Court has “more than once cautioned that courts should not read into the patent laws limitations and conditions which the legislature has not expressed,”⁷⁵ the Court has nevertheless imposed a series of exceptions amounting to judicial redefinitions of statutory subject matter.⁷⁶ The Court’s current

72. *Diamond v. Diehr*, 450 U.S. 175, 182 (1981) (“[A] process has historically enjoyed patent protection because it was considered a form of ‘art’ as that term was used in the 1793 Act.”).

73. America Invents Act, H.R. 1249, 112th Cong. § 14 (2011) (amending 35 U.S.C.). The Act explicitly excluded tax strategy inventions from eligibility by amending the rules for evaluating prior art under 35 U.S.C. §§ 102 and 103, and it established a process for reviewing patentability of business methods, but it did not change the fundamental definition of statutory subject matter under 35 U.S.C. § 101. *Id.*

74. While the 1790 statute did not explicitly include “compositions of matter,” this category was, under English precedent, considered within the term “manufacture.” *In re Bilski*, 545 F.3d 943, 969 (Fed. Cir. 2008) (Dyk, J., concurring). Processes, though not mentioned in the 1793 statute, were considered patentable subject matter. In *Corning v. Burden*, 56 U.S. 252 (1854), the Court held that “[a] process, *eo nomine*, is not made the subject of a patent in our act of Congress. It is included under the general term ‘useful art.’” *Id.* at 267. In *Cochrane v. Deener*, 94 U.S. 780 (1877), the Court held:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. . . . 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. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art.

Id. at 787-88. In *Tilghman v. Proctor*, 102 U.S. 707 (1881), the Court held, “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 . . .” *Id.* at 723. Finally, in *Diamond v. Diehr*, the 1952 statutory change from “art” to “process” was held to simply modernize the eighteenth-century term “art” which, in contemporary terminology, would have included processes. 450 U.S. at 175. “Analysis of the eligibility of a claim of patent protection for a ‘process’ did not change with the addition of that term to § 101.” *Id.* at 184.

75. *Diehr*, 450 U.S. at 182 (citations omitted).

76. Alternative justifications have been offered, treating inventions falling within the exceptions as either “not inventive” or as obvious, on the theory that laws of nature are in the

definition excludes laws of nature, physical phenomena, and abstract ideas.⁷⁷ Tracing the path to that definition should prove informative.

1. Scientific Principles

The Court's exploration of the meaning of "statutory subject matter" began with a series of decisions in the 1850s in which the Court attempted to draw a distinction between understanding a scientific principle and finding a use for the principle.⁷⁸ The Court concluded 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 [sic]"⁷⁹ and that "[i]t is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself."⁸⁰

The Court's application of the distinction between understanding a scientific principle and finding a use for the principle is illustrated in *O'Reilly v. Morse*,⁸¹ the 1854 case determining the patentability of Samuel Morse's invention of the telegraph. Morse had claimed his invention in several ways: (1) as "a process of using electromagnetism to produce distinguishable signs for telegraphy";⁸² (2) as a "system of signs, consisting of dots and spaces, and of dots, spaces, and horizontal lines, for numerals, letters, words, or sentences, substantially as herein set forth and illustrated, for telegraphic purposes";⁸³ and (3) as "the use of the motive power of the electro or galvanic current, which I call electro-magnetism, however developed, for making or printing intelligible characters, signs or letters at any distances . . ."⁸⁴ The Court found the first two formulations of the invention patentable and the third unpatentable, distinguishing between patentable specific uses of electromagnetism and unpatentable claims to the use of magnetism as a motive power,

public domain, presumably meaning that they were constructively known, although only recently discovered. See, e.g., *Bilski v. Kappos*, 130 S. Ct. 3218, 3230 (2010); Sarnoff, *supra* note 19. Neither can be supported by a testable rationale, see *infra* note 320, and in any event, whatever the terminology used, the Court is still rewriting the statute.

77. *Diehr*, 450 U.S. at 188; *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

78. In 1853, as now, the patent statute required that the invention for which a patent was sought must be "useful." See *supra* note 65.

79. *Le Roy v. Tatham*, 55 U.S. 156, 175 (1852).

80. *Corning v. Burden*, 56 U.S. (15 How.) 252, 268 (1854).

81. *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 113 (1854).

82. *Gottschalk v. Benson*, 409 U.S. 63, 68 (1972) (citing *Morse*, 56 U.S. at 111).

83. *In re Bilski*, 545 F.3d 943, 983 (Fed. Cir. 2008) (internal quotation marks omitted).

84. *Morse*, 56 U.S. at 62.

without specifying how the concept was used.⁸⁵ The Court rejected the third formulation⁸⁶ because it attempted to claim something that Morse had not invented and could not describe.⁸⁷

The *Morse* case would yield the same result today, but a court would likely decide the issue under 35 U.S.C. § 112, which requires that an applicant for a patent provide a written description sufficiently instructing others how to make and use the claimed invention,⁸⁸ rather than under 35 U.S.C. § 101. The language in the Court's opinion that Morse "indeed had not invented"⁸⁹ could be stretched to mean that Morse's discovery was not an invention, but the context better supports a reading that Morse's claim covered things that Morse had not *yet* invented.⁹⁰

In 1874, the Court declared that "an idea of itself is not patentable, but a new device by which it may be made practically useful is."⁹¹ The idea in question was the creation of a small hole in a rubber eraser meant to allow the eraser to fit on the end of a pencil.⁹² The Court observed that "the idea of this patentee was a good one, but

85. *Id.* at 112-13.

86. The third formulation was Claim 8 of the Morse application. *Id.* at 113. Patent applicants are allowed to present multiple claims to the same invention for reasons that should be clear from the Court's decision: although each relates to the same invention, the scope that is patentable is unknown until the US Patent and Trademark Office has examined the application and the courts have held it valid. *See generally id.* Therefore, applicants are encouraged to present multiple claims: "(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery. (b) More than one claim may be presented provided they differ substantially from each other and are not unduly multiplied." 37 C.F.R. § 1.75 (2012). The Patent Office recommends:

Many of the difficulties encountered in the prosecution of patent applications after final rejection may be alleviated if each applicant includes, at the time of filing or no later than the first reply, claims varying from the broadest to which he or she believes he or she is entitled to the most detailed that he or she is willing to accept.

U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 608.01(m) (8th ed. rev. 8, 2010).

87. "In fine 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. The Court is of opinion that the claim is too broad, and not warranted by law." *Morse*, 56 U.S. at 113.

88. 35 U.S.C. § 112 (2006) ("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 . . .").

89. *Morse*, 56 U.S. at 113 ("In fine he claims ...[a] process which he has not described and indeed had not invented.").

90. In fact, the Court also observed, "For aught that we now know some future inventor, 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." *Morse*, 56 U.S. at 113.

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

92. *Id.*

his device to give it effect, though useful, was not new," and was therefore not patentable.⁹³ As the Court construed the claims, all that the inventor had done was to recognize, as others had before, that, "if a solid substance was inserted into a cavity in a piece of rubber smaller than itself, the rubber would cling to it."⁹⁴

The Court noted that this observation of a natural characteristic of rubber "adds nothing . . . patentable."⁹⁵ In the Court's view, "the small opening in the piece of rubber not limited in form or shape, was not patentable, neither was the elasticity of the rubber [sic]."⁹⁶ The Court refused to allow a patent for what it viewed as "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"⁹⁷

Under this view of the claim, the Court would reach the same result today under 35 U.S.C. § 102 (or § 103).⁹⁸ Accepting the view that it was already known that inserting something into a hole in a piece of rubber is a convenient way to provide an eraser, it is hard to see the non-obviousness of doing so using a pencil as the "something."

In *Tilghman v. Proctor*,⁹⁹ the Court looked to English precedent to conclude that there was a "true distinction between a mere principle . . . and a process by which a principle is applied to effect a useful result."¹⁰⁰ The Court noted:

That a hot-blast is better than a cold-blast for smelting iron in a furnace was the principle or scientific fact discovered by Neilson; and yet, being nothing but a principle, he could not have a patent for that. But having invented and practically exemplified a process for utilizing this principle, namely, that of heating the blast, in a receptacle, between the blowing apparatus and the furnace, he was entitled to a patent for that

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

98. 35 U.S.C. § 102 precludes patentability for things that are not new. § 102 (2006). Arguably, while the eraser and its properties were known, as were pencils and erasers, the combination would be viewed as a new combination, but even under this view, § 103 would likely bar patentability today. That section provides:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of [35 U.S.C.], if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Id. § 103. Section 103 was not added to the statute until 1952. *Id.* (originally enacted as Patent Act of 1952, July 19, 1952, ch. 950, § 1, 66 Stat. 792, 792). However, by 1874 the principle that would be codified in § 103 had been recognized by the Supreme Court. *Hotchkiss v. Greenwood*, 52 U.S. 248, 257 (1851).

99. *Tilghman v. Proctor*, 102 U.S. 707 (1881).

100. *Id.* at 724.

process Another person might invent a better apparatus for applying the process¹⁰¹

Showing that even the highest court in the land has no particular insight into the future, the Court opined,

It seems to us that this clear and exact summary of the law affords the key to almost every case that can arise Whoever discovers that a certain useful result will be produced in any art by the use of certain means is entitled to a patent for it, provided he specifies the means [I]t 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. If the mode of applying the process is not obvious, then a description of a particular mode by which it may be applied is sufficient Perhaps the process is susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is not bound to describe them all But he must describe some particular mode, or some apparatus, by which the process can be applied¹⁰²

A modern court thus could resolve the case comfortably under 35 U.S.C. § 112; having shown one way to carry out a process embodying a chemical principle, the Court held that the inventor was entitled to a patent covering the process, regardless of the mechanisms that might be used to carry out the process.¹⁰³

In 1891, the Court continued the effort to define patentable subject matter, this time by defining the concept of “invention.”¹⁰⁴ The Court concluded, “[t]he truth is the word [“invention”] cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not.”¹⁰⁵

101. *Id.* at 724-25.

102. *Id.* at 728-29.

103. *Id.* at 709-10.

104. Interestingly, the term “invention” has never been defined in a US patent statute. The current statute includes “invention” in the list of definitions, but the definition is “invention or discovery.” 35 U.S.C. § 100(a) (2006).

105. *McClain v. Ortmyer*, 141 U.S. 419, 427 (1891). The Court went on to note:

What shall be construed as invention within the meaning of the patent laws has been made the subject of a great amount of discussion By some, “invention” is described as the contriving or constructing of that which had not before existed; and by another, giving a construction to the patent law, as “the finding out, contriving, devising or creating something new and useful, which did not exist before, by an operation of the intellect.” To say that the act of invention is the production of something new and useful does not solve the difficulty of giving an accurate definition, since the question of what is new, as distinguished from that which is a colorable variation of what is old, is usually the very question in issue. To say that it involves an operation of the intellect, is a product of intuition, or of something akin to genius, as distinguished from mere mechanical skill, draws one somewhat nearer to an appreciation of the true distinction, but it does not adequately express the idea. The truth is, the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not. In a given case we may be able to say that there is present invention of a very high order. In another we can see that there is lacking that impalpable something which distinguishes invention from simple mechanical skill. Courts, adopting fixed principles as a guide, have by a process of exclusion determined that certain variations in old devices do or do not involve invention; but whether the variation

In 1933, the Court tangentially addressed patentable subject matter in a case involving ownership of an invention developed by a government employee outside the scope of his employment.¹⁰⁶ The Court rejected a theory that would imply an assignment from employees to employers, in part because of the difficulty of identifying the point at which invention took place.¹⁰⁷ The Court observed, “the act of invention . . . consists neither in finding out the laws of nature, nor in fruitful research as to the operation of natural laws, but in discovering how those laws may be utilized or applied for some beneficial purpose, by a process, a device or a machine.”¹⁰⁸

In 1939, the Court, in dictum, made a subtle change in language, which in retrospect marked a significant change in philosophy. In *Mackay Radio & Telegraph Co. v. Radio Corp. of America*,¹⁰⁹ the parties asked the Court to construe a claim for a radio antenna produced according to a previously known formula for calculating optimum configuration.¹¹⁰ The Court held that the accused device did not infringe the claimed invention.¹¹¹ In construing the claim, the trial court viewed the invention as the relationship of components determined by a formula that was disclosed in the specifications.¹¹² A third party had developed the formula, which had been published in a scientific journal years earlier.¹¹³ Nevertheless, the Court assumed that the patent claim covered an invention and

relied upon in a particular case is anything more than ordinary mechanical skill is a question which cannot be answered by applying the test of any general definition.

Id. at 426-27.

106. *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 182 (1933).

107. *Id.* at 187-88.

108. *Id.* at 188 (“The reluctance of courts to imply or infer an agreement by the employee to assign his patent is due to a recognition of the peculiar nature of the act of invention, which consists neither in finding out the laws of nature, nor in fruitful research as to the operation of natural laws, but in discovering how those laws may be utilized or applied for some beneficial purpose, by a process, a device, or a machine. It is the result of an inventive act, the birth of an idea and its reduction to practice; the product of original thought; a concept demonstrated to be true by practical application or embodiment in tangible form.”).

109. *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86 (1939).

110. *Id.* at 98-99.

111. *Id.* at 102.

112. *Id.* at 92.

113. *Id.* at 93-94 (“Carter did not invent the formula. It had been developed by Abraham and published in a scientific journal thirty years before. . . . Abraham’s formula expressed the scientific truth that when radio activity is projected from a charged wire of finite length, i.e., one having standing waves, and having a length of a multiple of half wave lengths, the angle between the direction of the principal radio activity and the wire is dependent on wave length and wire length, which is a multiple of half wave lengths. . . . It is plain, therefore, that the Carter invention, *if it was invention*, consisted in taking the angle of the Abraham formula as the angle between each wire of the V antenna and its bisector.” (emphasis added)).

was valid,¹¹⁴ and stated in dictum¹¹⁵ that “[w]hile a scientific truth, or the mathematical expression of it, is not patentable, a novel and useful structure created with the aid of knowledge of scientific truth may be.”¹¹⁶

While irrelevant to the resolution of the case before the Court, and supported by no citation of authority, this language marked a shift from earlier statutory-subject-matter cases. *Tilghman* required only that an applicant provide one practical process for using a scientific principle, whereas the dictum in *Mackay* laid the foundation for the Court’s first general exclusion from patentable statutory subject matter: scientific principles.¹¹⁷

2. Laws of Nature

The second exception to patentable statutory subject matter, laws of nature, emerged from the 1948 case of *Funk Bros. Seed Co. v. Kalo Inoculant*.¹¹⁸ The technology at issue involved the application of root nodule bacteria to certain field crops to increase yield.¹¹⁹ Prior to the “invention,” farmers used several different types of bacterial inoculants depending on the type of crop.¹²⁰ Inoculant manufacturers believed farmers needed to apply each inoculant independently because of mutual inhibition.¹²¹ The “invention” claimed a combination of several inoculants, which the applicant had found could efficiently coexist.¹²² In holding the invention unpatentable, the Court announced another exception to the statutory language in 35 U.S.C. § 101, choosing expansive language when (as a dissenting opinion points out) a much narrower ground of decision was available.¹²³ The majority held that the combination of naturally occurring inoculants was a product of nature, even though the Court cited no evidence that the combination naturally occurred together,

114. *Id.* at 94 (“We assume, without deciding the point, that this advance was invention even though it was achieved by the logical application of a known scientific law to a familiar type of antenna.”).

115. The issue would arise if the accused device had been covered by the claim and if the applicant had invented the formula rather than adapted a previously published formula. In that case, there would be infringement unless the claim were invalid, and patentability could not be defeated under 35 U.S.C. § 102, so it would be necessary to reach the 35 U.S.C. § 101 issue.

116. *Mackay*, 306 U.S. at 94.

117. Compare *id.*, with *Tilghman v. Proctor*, 102 U.S. 707, 724-25 (1881).

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

119. *Id.* at 131.

120. *Id.* at 129-30.

121. *Id.*

122. *Id.* at 130.

123. *Id.* at 137 (Burton, J., dissenting).

much less in combination in a bag.¹²⁴ The Court held that “[h]e 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.”¹²⁵ The Court found that the “invention” did not constitute an advancement over what already existed in nature:

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 use in 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.¹²⁶

The Court drew a distinction between discovering a law of nature and applying it:

The 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. 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.¹²⁷

The conclusion that “manifestations of laws of nature” were “free to all men” (i.e., not patentable subject matter) established the second Supreme Court exception to the statutory language of § 101.¹²⁸

Although he concurred in the result, the rationale troubled Justice Frankfurter:

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.”¹²⁹

Instead, Justice Frankfurter preferred to decide the case on a basis that did not require limiting Congress’s statutory language: since “the strains that Bond put together in the product which he patented can be specified only by the properties of the mixture,” the application would not satisfy the disclosure requirements (now found

124. *Id.* at 130.

125. *Id.*

126. *Id.* at 131.

127. *Id.* at 130.

128. The statutory section at issue in *Funk Bros.* was § 31, comparable to § 101 of the statute as revised in 1952. *Id.* at 132.

129. *Id.* at 134-35 (Frankfurter, J., concurring).

in 35 U.S.C. § 112), and therefore the same decision could be reached without creating a new exception to § 101.¹³⁰

3. Abstract Ideas

In 1972, the Court established the “abstract ideas” exception to patentable statutory subject matter when it faced a patent application that claimed a process for converting numbers from binary-coded decimal format to the binary format used by digital computers.¹³¹ The Court in *Gottschalk v. Benson* held that a claim to a computer-implemented method of converting numbers was not an invention under § 101.¹³² Because the method had “no substantial practical application except in connection with a digital computer,” it was not limited to a specific use and therefore amounted to nothing more than an unpatentable mathematical algorithm.¹³³ The Court stated that such a mathematical formula was simply an abstract idea, akin to unpatentable phenomena of nature and abstract concepts.¹³⁴ The Court then summarized, “[p]henomena 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.”¹³⁵ Under this theory, the problem with allowing a patent on the invention was that it “wholly pre-empts” the use of a mathematical formula and therefore was not patentable subject matter.¹³⁶ The Court recognized an alternative ground for reaching the same result (without requiring alteration of the statutory interpretation), describing the claimed mathematical process as “so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion.”¹³⁷ Since *Morse* precludes a

130. *Id.* at 134. The patent claimed “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.” U.S. Patent No. 2,200,532 (filed Aug. 23, 1939). 35 U.S.C. § 112 requires an applicant to provide

a written description of the same, 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

§ 112 (2006).

131. *Gottschalk v. Benson*, 409 U.S. 63, 64 (1972).

132. *Id.* at 71-72.

133. *Id.*

134. *Id.* at 67.

135. *Id.*

136. *See id.* at 71-72.

137. *Id.* at 68.

patentee from claiming more than he has actually invented,¹³⁸ such an overly broad claim could be found unpatentable without the need to construe § 101.¹³⁹

In *Dann v. Johnston*, the Court had the opportunity to invalidate a patent under its newly formulated interpretation of 35 U.S.C. § 101, but chose instead the less invasive route of finding the claim obvious, and therefore unpatentable under 35 U.S.C. § 103.¹⁴⁰ The invention at issue was claimed as a “machine system for automatic record-keeping of bank checks and deposits.”¹⁴¹ The system allowed bank customers to write category codes on deposit slips and checks, which the bank would then encode using magnetic ink when the items cleared, allowing the codes to be electronically stored and tabulated by data processors so that the bank could provide the customer with a summary, subtotaled by category.¹⁴² Following a lengthy process within the Patent Office,¹⁴³ the Court of Customs and Patent Appeals held that the invention was a “record-keeping machine system,” which was “clearly within the ‘technological arts,’” and therefore statutory subject matter under 35 U.S.C. § 101.¹⁴⁴ The Supreme Court invalidated the patent, but avoided the statutory subject matter issue by holding the invention obvious under 35 U.S.C. § 103.¹⁴⁵

In *Parker v. Flook*, the Court clarified that a “process is not unpatentable simply because it contains a law of nature.”¹⁴⁶ The patent at issue included claims to a catalytic conversion process that involved the use of a formula, which the Court assumed to be novel and useful, to calculate and update “alarm limits.”¹⁴⁷ Drawing on the formulation of *Benson*, the Court explained that determining whether

138. O'Reilly v. Morse, 56 U.S. (15 How.) 62, 113 (1854).

139. See 35 U.S.C. § 112 (2006); *In re Dowdall*, 315 F.2d 929, 930 (C.C.P.A. 1963).

140. *Dann v. Johnston*, 425 U.S. 219, 220 (1976) (“Petitioner and respondent, as well as various *amici*, have presented lengthy arguments addressed to the question of the general patentability of computer programs. . . . We find no need to treat that question in this case, however, because we conclude that in any event respondent's system is unpatentable on grounds of obviousness.” (citation omitted)).

141. *Id.*

142. *Id.* at 221-22.

143. The examiner rejected the claims for lack of novelty under 35 U.S.C. § 102, and as indefinite under 35 U.S.C. § 112. *Id.* at 223. Upon appeal, the Patent Office's internal review board rejected the claims on a different theory, considering them beyond the field of technology and therefore not statutory subject matter under 35 U.S.C. § 101. *Id.* The Patent Office also rejected the claims on grounds of obviousness, rendering the claims unpatentable under 35 U.S.C. § 103. *Id.*

144. *Id.* at 223-24.

145. *Id.* at 225.

146. *Parker v. Flook*, 437 U.S. 584, 590 (1978).

147. *Id.* at 586-87.

a claim containing a mathematical algorithm is statutory subject matter is not simply a matter of whether the claim “wholly pre-empts” the mathematical algorithm, but whether “once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention.”¹⁴⁸ Noting an “unclear line” between an abstract principle and the application of that principle,¹⁴⁹ the Court concluded that the process was not statutory subject matter under § 101 since it was merely a mathematical formula, which was “not the kind of ‘discover[y]’ that the statute was enacted to protect.”¹⁵⁰

Subsequently, in *Diamond v. Diehr*, the Court explained its decision in *Flook*: the patent application did not “contain any disclosure relating to the chemical processes at work, the monitoring of the process variables, nor the means of setting off an alarm or adjusting an alarm system. All that it provides is a formula for computing an updated alarm limit.”¹⁵¹ This interpretation suggests that the decision in *Flook* does not implicate statutory subject matter at all, but rather is a straightforward application of the disclosure/enablement requirements of 35 U.S.C. § 112.¹⁵²

The fate of the biotechnology industry hung in the balance in *Diamond v. Chakrabarty*, as the application for a patent on the invention of a genetically modified bacterium worked its way through the courts.¹⁵³ As Chief Justice Burger framed the issue before the Supreme Court, “We granted certiorari to determine whether a live, human-made micro-organism is patentable subject matter under 35 U.S.C. § 101.”¹⁵⁴ The fundamental discovery described in the patent application was that a bacterium could be genetically modified to give it a new property: the ability to digest oil spills.¹⁵⁵ The application

148. *Id.* at 594.

149. *Id.* at 589.

150. *Id.* at 593; *see supra* note 9.

151. *Diamond v. Diehr*, 450 U.S. 175, 186-87 (1981) (quoting *Flook*, 437 U.S. at 586) (internal quotation marks omitted).

152. The statute’s requirements entail:

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, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. § 112 (2006).

153. *See* Dan L. Burk, Oppenheimer, Wolff & Donnelly Prof. of Law, Univ. of Minn., Honorable Helen Wilson Nies Memorial Lecture: Tailoring Patent Policy to Specific Industries (Apr. 10, 2003), in 7 MARQ. INTELL. PROP. L. REV. 1, 3-4 (2003).

154. *Diamond v. Chakrabarty*, 447 U.S. 303, 305 (1980).

155. *Chakrabarty* had inserted plasmids into *Pseudomonas* bacteria, which gave the bacteria a new property, the ability to break down multiple components of crude oil, a property

sought to claim the invention in three ways: (1) the method for producing the modified bacteria (a process), (2) the modified bacteria mixed with a carrier that would float on water (a composition of matter), and (3) the bacteria themselves.¹⁵⁶ The patent examiner granted the first two categories of claims, but rejected claims to the bacteria themselves because they were “products of nature,” and living things were unpatentable *per se*.¹⁵⁷

The Patent Office’s internal review board overruled the examiner’s “product of nature” rejection, concluding that genetically modified bacteria did not occur naturally; it affirmed the rejection per the “living things” rationale.¹⁵⁸ The appellate court reversed, holding the claims to the organism to be patentable.¹⁵⁹ In 1980, the Supreme Court viewed the issue as “a narrow one of statutory interpretation requiring us to construe 35 U.S.C. § 101,” and began the analysis by repeating its caution from *Dubilier*, that courts “should not read into the patent laws limitations and conditions which the legislature has not expressed.”¹⁶⁰ The Court reviewed the legislative history of the 1952 Patent Act,¹⁶¹ and concluded 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.”¹⁶² Thus, the Court held that the bacterium, although living, was patentable subject matter.¹⁶³

Having disposed of the case before it, the Court then went on to consolidate the current judicial interpretation of the limits on statutory subject matter:

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

“which is possessed by no naturally occurring bacteria” and “believed to have significant value for the treatment of oil spills.” *See id.*

156. *Id.* at 305-06.

157. *Id.* at 306.

158. *Id.*

159. *Id.* The route to the Court was convoluted, involving two petitions for certiorari and a remand for reconsideration. *Id.* at 306-07.

160. *Id.* at 307-08 (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199 (1933)).

161. *Id.* at 308-09. The Committee Report accompanying the 1952 Act included a statement that “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.” S. REP. NO. 82-1979, at 5 (1952); H.R. REP. NO. 82-1923, at 6 (1952). The Court interpreted the language as “inform[ing] us that Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’” *Chakrabarty*, 447 U.S. at 309 (quoting S. REP. NO. 82-1979; H.R. REP. NO. 82-1923).

162. *Chakrabarty*, 447 U.S. at 308.

163. *Id.* at 310.

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.”¹⁶⁴

The Court thus created three broad exceptions to the statutory language, while concluding that Congress intended to give patents a wide scope and reminding the lower courts that “our obligation is to take statutes as we find them, guided, if ambiguity appears, by the legislative history and statutory purpose.”¹⁶⁵

4. Patentable Subject Matter After *Chakrabarty*

In *Diamond v. Diehr*, the Court reiterated that “laws of nature, natural phenomena, and abstract ideas” were not patentable.¹⁶⁶ Furthermore, “while a claim drawn to a fundamental principle is unpatentable, ‘an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.’”¹⁶⁷ The Court then affirmed the Court of Customs and Patent Appeals’ decision, which had overruled the Patent Office’s *Benson*-based rejection.¹⁶⁸ The applicant had claimed an improvement in making molded rubber products, which involved monitoring the temperature inside the mold and using a well-known equation to calculate the required cure time based on the measured temperature.¹⁶⁹

164. *Id.* at 309 (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)) (citing *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972); *O’Reilly v. Morse*, 15 How. 62, 112-121 (1854); *Le Roy v. Tatham*, 14 How. 156, 175 (1853)).

165. *Id.* at 313, 315.

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

167. *In re Bilski*, 545 F.3d 943, 953 (Fed. Cir. 2008) (quoting *Diehr*, 450 U.S. at 187-88).

168. *Id.* at 180-81.

169. *Id.* at 187. The first claim provided:

A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising: providing said computer with a data base for said press including at least, natural logarithm conversion data (ln), the activation energy constant (C) unique to each batch of said compound being molded, and a constant (x) dependent upon the geometry of the particular mold of the press, initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure, constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding, constantly providing the computer with the temperature (Z), repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is $\ln v = CZ + x$ where v is the total required cure time, repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and opening the press automatically when a said comparison indicates equivalence.

Id. at 179 n.5 (internal quotation marks omitted).

The Patent Office rejected the claim as not falling within statutorily acceptable subject matter.¹⁷⁰ The Court of Customs and Patent Appeals reversed, holding that a claim is not nonstatutory per se simply because a computer is involved.¹⁷¹ While reiterating that an algorithm or mathematical formula is like a law of nature, which cannot be the subject of a patent, the Supreme Court held that the claim was not an attempt to patent a mathematical formula but rather “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.”¹⁷² The Court traced the development of its rule for determining whether a process was statutory subject matter, noting that in *Benson* the Court “repeated the . . . definition recited in *Cochrane v. Deener*, adding: “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.”¹⁷³

The Court declined an opportunity to clarify application of the “natural phenomenon” exception in *Laboratory Corp. of America v. Metabolite Laboratories, Inc.*¹⁷⁴ The patent at issue claimed a process for diagnosing vitamin deficiency by correlating the level of a compound in blood with the deficiency.¹⁷⁵ The district court upheld a jury verdict that the patent was valid and infringed, the Federal Circuit affirmed, and the Supreme Court granted certiorari to determine whether the claim was invalid as an attempt to “claim a monopoly over a basic scientific relationship.”¹⁷⁶ The Court, however,

170. *Id.* at 179.

171. *Id.* at 181.

172. *Id.* at 187. The Court stated:

We have before us today only the question of whether respondents' claims fall within the § 101 categories of possibly patentable subject matter. We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula. . . . [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. Because we do not view respondents' claims as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products, we affirm

Id. at 191-93.

173. *Id.* at 184.

174. *See* *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc. (Labcorp)*, 548 U.S. 124, 125-26 (2006) (Breyer, J., dissenting).

175. *Id.* at 129. The patent claimed “A method for detecting a deficiency of cobalamin or folate in warm-blooded animals comprising the steps of: assaying a body fluid for an elevated level of total homocysteine; and correlating an elevated level of total homocysteine in said body fluid with a deficiency of cobalamin or folate.” *Id.* (internal quotation marks omitted).

176. *Id.* at 132.

dismissed the writ as improvidently granted, with three justices dissenting.¹⁷⁷

In 2010, the Court presented a clear summary of its then-current interpretation of the language of § 101 in *Bilski v. Kappos*.¹⁷⁸ The patent application at issue claimed a computer-implemented system that employed a mathematical formula for hedging risk.¹⁷⁹ The Patent Office and lower courts all held the claims were not valid statutory subject matter.¹⁸⁰ In affirming, the Court summarized:

Section 101 specifies four independent categories of inventions or discoveries that are patent eligible “Congress plainly contemplated that the patent laws would be given wide scope” The Court’s precedents provide three specific exceptions to § 101’s broad principles: “laws of nature, physical phenomena and abstract ideas.” *While not required by the statutory text, these exceptions are consistent with the notion that a patentable process must be “new and useful.” And in any case, the exceptions have defined the statute’s reach as a matter of statutory stare decisis going back 150 years.*¹⁸¹

The Court took the opportunity to remind the Federal Circuit that it had provided no bright-line test for patentability:

The machine-or-transformation test¹⁸² is not the sole test for patent eligibility under § 101. The Court’s precedents establish that although that test may be a useful and important clue or investigative tool, it is not the sole test for deciding whether an invention is a patent-eligible “process” under § 101. In holding to the contrary, the Federal Circuit violated two principles of statutory interpretation: Courts “should not read into the patent laws limitations and conditions which the legislature has not expressed,” and “[u]nless otherwise defined, ‘words will be interpreted as taking their ordinary, contemporary, common meaning.’”¹⁸³

Finally, in March, 2012, the Court answered the question it had thought premature in 2010. In *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,¹⁸⁴ although noting that “too broad an interpretation of this exclusionary principle could eviscerate patent law” because “all inventions at some level embody . . . laws of nature, natural phenomena, or abstract ideas,”¹⁸⁵ a unanimous Court reiterated the exclusions from statutory subject matter, stating that “‘laws of nature, natural phenomena and abstract ideas’ are not

177. *Id.* at 125.

178. *See* 130 S. Ct. 3218, 3221 (2010).

179. *Id.* at 3220.

180. *Id.*

181. *Id.* at 3221 (emphasis added) (citations omitted) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 309 (1980) (internal quotation marks omitted)).

182. This is the test the Federal Circuit had applied, *id.*, relying on language in *Diamond v. Diehr*, 450 U.S. 175, 183 (1981).

183. *Bilski*, 130 S. Ct. at 3221 (citation omitted) (quoting *Diehr*, 450 U.S. at 183).

184. 132 S. Ct. 1289 (2012).

185. *Id.* at 1293.

patentable.”¹⁸⁶ In *Mayo*, the inventor had discovered the precise correlation between the level of a drug metabolite in a patient’s blood and the efficacy of the dose of the drug the patient was taking.¹⁸⁷ A representative claim to the method of optimizing the drug dosage required administering the drug, measuring the level of the metabolite in the patient, and decreasing or increasing the dosage depending on whether the metabolite level was above or below a specified trigger level.¹⁸⁸

Echoing the concerns over monopolization of a law of nature voiced in dissent in *Labcorp*, Justice Breyer, now writing for a unanimous court, held that the claim amounted to no more than informing a “relevant audience about certain laws of nature” followed by “conventional activity” and was unpatentable.¹⁸⁹

Summarizing the Court’s holdings, “laws of nature, natural phenomena, and abstract ideas” are not patentable subject matter.¹⁹⁰ “A principle, in the abstract, is a fundamental truth; . . . these cannot be patented, as no one can claim in either of them an exclusive right.”¹⁹¹ These categories are unpatentable because they are “part of the storehouse of knowledge . . . free to all men and reserved exclusively to none.”¹⁹² The Court’s explanations of this conclusion reduce to this simple tautology: laws of nature are not patentable because no one may possess the exclusive right to them that would be granted by a patent.¹⁹³

D. Federal Circuit Applications—A Struggle to Keep Up

The history of the development of the judicial exceptions to the language of § 101 would not be complete without a brief review of the efforts of the Federal Circuit and its predecessors to implement the rules announced by the Supreme Court.¹⁹⁴

186. *Id.* at 1290 (quoting *Diamond v. Diehr*, 450 U.S. 175, 185 (1981)).

187. *Id.* at 1294-95.

188. *Id.* at 1295.

189. *Id.* at 1298.

190. *Diehr*, 450 U.S. at 185; see *Parker v. Flook*, 437 U.S. 584, 589 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

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

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

193. See *Diehr*, 450 U.S. at 185; *Flook*, 437 U.S. at 589; *Benson*, 409 U.S. at 67; *Funk Bros.*, 333 U.S. at 130; *Le Roy*, 55 U.S. (14 How.) at 175.

194. Since October 1, 1982, all appeals of patentability decisions have gone to the Court of Appeals for the Federal Circuit. 28 U.S.C. § 1295 (2006). The Federal Circuit is therefore the principal interpreter of Supreme Court decisions in the field. *Cf. id.* The cases appear to evidence an attempt by the Federal Circuit to offer simple, bright-line tests for determining patentable subject matter, met at every turn by a reminder from the Supreme Court that there are no shortcuts, only broad principles. See, e.g., *Diehr*, 450 U.S. at 201 (Stevens, J., dissenting).

The Supreme Court itself has conceded that the “line between a patentable process and an unpatentable principle is not always clear.”¹⁹⁵ In an effort to apply the general rules announced by the Court to specific cases and to provide some degree of guidance and predictability, the lower courts have announced, and then abandoned, a series of shortcut tests for dividing unpatentable subject matter from patentable subject matter.¹⁹⁶

As the appeals courts attempt to understand the Court’s guidance, a sense of frustration over the seeming impossibility of implementing such guidance in practice surfaces,¹⁹⁷ raising the question of whether a standard which the courts can neither understand nor implement can be good law.

In a concurring opinion in *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, Judge Rader agreed with the majority’s determination of patentability, but stated, “Rather than perpetuate a non-statutory standard, I would find that the subject matter of the ’459 patent satisfies the statutory standards of the Patent Act.”¹⁹⁸ In *In re Alappat*, the Federal Circuit observed:

The Supreme Court has not been clear . . . as to whether such subject matter is excluded from the scope of § 101 because it represents laws of nature, natural phenomena, or abstract ideas. The Supreme Court also has not been clear as to exactly what kind of mathematical subject matter may not be patented. The Supreme Court has used, among others, the terms “mathematical algorithm,” “mathematical formula,” and “mathematical equation” to describe types of mathematical subject matter not entitled to patent protection standing alone. The Supreme Court has not set forth, however, any consistent or clear explanation of what it intended by such terms or how these terms are related, if at all.¹⁹⁹

195. *Flook*, 437 U.S. at 589. See also Justice Breyer’s dissenting opinion in *Labcorp*:

I concede that the category of non patentable “[p]henomena of nature,” like the categories of “mental processes” and “abstract intellectual concepts,” is not easy to define. After all, many a patentable invention rests upon its inventor’s knowledge of natural phenomena; many “process” patents seek to make abstract intellectual concepts workably concrete; and all conscious human action involves a mental process.

548 U.S. 124, 134 (2006) (Breyer, J., dissenting) (citation omitted).

196. *E.g.*, *Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053, 1062 (Fed. Cir. 1992) (Rader, J., concurring) (“In the wake of *Benson*, the Court of Customs and Patent Appeals struggled to implement the algorithm rule. Much of the difficulty sprang from the obscurity of the terms invoked to preclude patentability—terms like ‘law of nature,’ ‘natural phenomena,’ ‘formulae,’ or ‘algorithm.’” (footnote omitted) (quoting *Benson*, 409 U.S. at 65)).

197. Commentators have also misapprehended the Court’s commands. Perhaps overly optimistically, A. Samuel Oddi concluded in 2006 that “[w]hat has become apparent is that § 101 patentable subject matter, after Chakrabarty, Diehr, and State Street, is no longer a significant impediment to patentability.” A. Samuel Oddi, *Regeneration in American Patent Law: Statutory Subject Matter*, 46 IDEA 491, 557 (2006).

198. 958 F.2d at 1061 (Rader, J., concurring).

199. 33 F.3d 1526, 1543 n.19 (Fed. Cir. 1994) (citations omitted). The Federal Circuit is not alone in its confusion as to how to apply the Supreme Court tests. While concurring in the result in *Bilski*, Justice Stevens observed that the majority had failed to explain how it reached

The Federal Circuit's confusion is understandable. As will be seen, later efforts by the Supreme Court to clarify the scope of the exclusions were not completely successful.

1. The "Mental Steps" and "Function of a Machine" Exceptions

The dissent in *Diehr* summarized several early attempts by the appellate courts to formulate a coherent jurisprudence consistent with the Supreme Court's theory of exceptions to the statutory language first articulated in *Corning v. Burden*: "[It] is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it."²⁰⁰ The Court subsequently reaffirmed the doctrine on several occasions.²⁰¹ However, when the Court of Customs and Patent Appeals abandoned the function-of-a-machine exception in *In re Tarczy-Hornoch*,²⁰² it held that the doctrine was contrary to "the basic purposes of the patent system and productive of a range of undesirable results from the harshly inequitable to the silly."²⁰³

Drawing from the *Corning* language, appellate courts also concluded that mental operations were unpatentable per se,²⁰⁴ "based upon the familiar principle that a scientific concept or mere idea cannot be the subject of a valid patent."²⁰⁵ Courts applied the mental steps doctrine inconsistently,²⁰⁶ and in *In re Prater*, the Court of Customs and Patent Appeals abandoned the doctrine, holding that the mere fact that a process could be performed mentally did not preclude patentability if the process could also be performed without mental processes.²⁰⁷

the conclusion that the claims at issue were abstract ideas. *Bilski v. Kappos*, 130 S. Ct. 3218, 3235 (2010) (Stevens, J., concurring).

200. *Corning v. Burden*, 56 U.S. (15 How.) 252, 268 (1854).

201. *Expanded Metal Co. v. Bradford*, 214 U.S. 366, 383 (1909); *Busch v. Jones*, 184 U.S. 598, 607 (1902); *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 554-57 (1898); *Risdon Iron & Locomotive Works v. Medart*, 158 U.S. 68, 78-79, 84 (1895).

202. *In re Tarczy-Hornoch*, 397 F.2d 856, 866-67 (C.C.P.A. 1968).

203. *Id.* at 867.

204. *In re Shao Wen Yuan*, 188 F.2d 377, 380-83 (C.C.P.A. 1951); *In re Heritage*, 150 F.2d 554, 556-58 (C.C.P.A. 1945).

205. *Diamond v. Diehr*, 450 U.S. 175, 195 (1981) (Stevens, J., dissenting).

206. Kevin Collins, *Propertizing Thought*, 60 SMU L. REV. 317, 355 (2007).

207. *In re Prater*, 415 F.2d 1378, 1389 (C.C.P.A. 1968), *superseded by* 415 F.2d 1393 (C.C.P.A. 1969). The court confirmed the abandonment of the mental steps exception in *In re Musgrave*, when it stated:

We cannot agree with the board that these claims (all the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because some or all the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think.

431 F.2d 882, 893 (C.C.P.A. 1970).

2. The Technological-Arts Requirement

In *In re Musgrave*, the Court of Customs and Patent Appeals held that a process was statutory subject matter if it was within the “technological arts,”²⁰⁸ and in 1970, the court in *In re Benson* held that the presence of a general-purpose computer in a process placed it within the technological arts.²⁰⁹ The Supreme Court rejected the technological-arts test in *Benson*.²¹⁰ Subsequently, the Federal Circuit (successor to the Court of Customs and Patent Appeals) reasoned that “[t]he fact that a nonstatutory method is carried out on a programmed computer does not make the process claim statutory.”²¹¹

3. The *Freeman-Walter-Abele* Test

The *Freeman-Walter-Abele* test, developed in a trio of cases,²¹² required a two-step review of claims.²¹³ First, courts were to ascertain whether the claim involved a mathematical algorithm.²¹⁴ If so, the courts had to determine whether the algorithm was applied to “physical elements or process steps.”²¹⁵

Applying this test in *Abele*, the court held that a claim involving an algorithm to evaluate data from a CAT scan was statutory subject matter because the algorithm influenced “production, detection, and display steps as manifestly statutory subject matter.”²¹⁶

AT&T v. Excel Communications involved a patent issued for an addition of a field in a telephone billing record that identified the long-distance carriers of the parties on either end of the phone line and allowed differential billing by using Boolean logic to determine if the carriers were the same.²¹⁷ The district court held that “the claims

208. *In re Musgrave*, 431 F.2d at 893.

209. *In re Benson*, 441 F.2d 682, 688 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972).

210. *Benson*, 409 U.S. at 72.

211. *In re Grams*, 888 F.2d 835, 841 (Fed. Cir. 1989).

212. *In re Abele*, 684 F.2d 902, 905 (C.C.P.A. 1982); *In re Walter*, 618 F.2d 758, 767-68 (C.C.P.A. 1980); *In re Freeman*, 573 F.2d 1237, 1245 (C.C.P.A. 1978).

213. *In re Freeman*, 573 F.2d at 1245.

214. *Id.*

215. *In re Abele*, 684 F.2d at 905-07.

216. *Id.* at 908.

217. *AT&T Corp. v. Excel Commc'ns*, 172 F.3d 1352, 1358 (Fed. Cir. 1999). The first claim provided:

A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of: generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and including, in

implicitly recite a mathematical algorithm, . . . and thus fall within the judicially created ‘mathematical algorithm’ exception to statutory subject matter.”²¹⁸ In evaluating the application of the *Freeman-Walter-Abele* test to the claims, the Federal Circuit concluded that “[w]hatever may be left of the earlier test, if anything, this type of physical limitations analysis seems of little value.”²¹⁹ In *In re Bilski*, however, the Federal Circuit again concluded that the *Freeman-Walter-Abele* test was inadequate and “the machine-or-transformation test is the applicable test for patent-eligible subject matter.”²²⁰

4. The “Useful, Concrete, and Tangible Result” Test

In *In Re Alappat*, the inventor had used an algorithm to smooth the appearance of oscilloscope waveforms by varying the intensity of displayed pixels as a function of the distance of the pixel from the actual waveform.²²¹ The examiner rejected the claims as nonstatutory.²²² The Board of Patent Appeals affirmed the rejection, reasoning that, “when the claim is viewed without the steps of this mathematical algorithm, no other elements or steps are found.”²²³ Therefore, the claim did not describe a machine, and it fell within the judicially created exception that precluded patenting “mathematical algorithms.”²²⁴ The Federal Circuit reversed, holding that, although the claim involved a formula, it was directed to a machine.²²⁵ “[T]he proper inquiry in dealing with the so called mathematical subject matter exception to § 101 alleged herein is to see whether the claimed subject matter as a whole is a disembodied mathematical concept”²²⁶ The Federal Circuit held: “That is not the case here. . . . This is not a disembodied mathematical concept . . . , but

said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

Id. at 1354.

218. *Id.* at 1355-56.

219. *Id.* at 1359.

220. *In re Bilski*, 545 F.3d 943, 959 (Fed. Cir. 2008), *aff'd, sub nom. Bilski v. Kappos*, 130 S. Ct. 3218 (2010). Although the Court affirmed the result, it noted that the machine-or-transformation test was but one of several ways of testing patentability and was not necessarily a requirement for patentable subject matter. *Bilski*, 130 S. Ct. at 3258.

221. *In re Alappat*, 33 F.3d 1526, 1537 (Fed. Cir. 1994).

222. *Id.* at 1531.

223. *Ex parte Alappat*, No. 1991-1277, 23 U.S.P.Q.2d (BNA) 1340, 1346 (B.P.A.I. May 12, 1992).

224. *Id.* at 1344.

225. *In re Alappat*, 33 F.3d at 1540-41.

226. *Id.* at 1544.

rather a specific machine to produce a useful, concrete, and tangible result.”²²⁷

In *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, the Federal Circuit applied the useful, concrete, and tangible result test to an invention for managing a series of financial accounts using a series of calculations.²²⁸ The court found that:

[T]he transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces “a useful, concrete and tangible result”—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.²²⁹

Thus, the invention satisfied the statutory-subject-matter requirement.²³⁰ Commenting on the decision in a non-binding opinion, Justice Breyer, in *Labcorp*, observed, “[T]he Federal Circuit’s decision in *State Street Bank* . . . does say that a process is patentable if it produces a ‘useful, concrete and tangible result.’ But this Court has never made such a statement and, if taken literally, the statement would cover instances where this Court has held the contrary.”²³¹ Justice Breyer offered the decisions in *Morse*, *Benson*, and *Flook* as examples of such instances.²³²

5. The Machine-or-Transformation Test

In *In re Ferguson*, the Federal Circuit applied the machine-or-transformation test to affirm the denial of a patent under § 101.²³³ The application claimed a method for marketing.²³⁴ The Patent Office’s internal board of appeals rejected the claim as an

227. *Id.*

228. *State St. Bank & Trust Co. v. Signature Fin. Grp., Inc.*, 149 F.3d 1368, 1373-74 (Fed. Cir. 1998).

229. *Id.* at 1373.

230. *Id.*

231. *Lab. Corp. of Am. Holdings v. Metabolite Labs. Inc.*, 548 U.S. 124, 136-37 (2006) (Breyer, J., dissenting) (citations omitted).

232. *Id.*

233. *In re Ferguson*, 558 F.3d 1359, 1363 (Fed. Cir. 2009).

234. The court noted the claim consisted of:

A method of marketing a product, comprising: developing a shared marketing force, said shared marketing force including at least marketing channels, which enable marketing a number of related products; using said shared marketing force to market a plurality of different products that are made by a plurality of different autonomous producing company, so that different autonomous companies, having different ownerships, respectively produce said related products; obtaining a share of total profits from each of said plurality of different autonomous producing companies in return for said using; and obtaining an exclusive right to market each of said plurality of products in return for said using.

Id. at 1361.

“abstract idea,” and therefore not statutory subject matter.²³⁵ The Federal Circuit affirmed the board’s denial, applying the machine-or-transformation test, and concluding Applicant’s method claims did not meet either prong of the machine-or-transformation test.²³⁶

Prometheus Laboratories, Inc. v. Mayo Collaborative Services involved claims similar to those presented in *Labcorp*, and the Federal Circuit again applied its machine-or-transformation test.²³⁷ The patent claimed methods for calibrating the proper dosage of thiopurine drugs by administering a drug, then determining the levels of the drug’s metabolites in the patient and comparing them to pre-determined metabolite levels, “wherein” the measured metabolite levels would indicate a need to increase or decrease the level of drug to be administered, so as to minimize toxicity and maximize efficacy of treatment.²³⁸ Mayo contended that the patent claimed natural phenomena—the correlations between metabolite levels and efficacy and toxicity—and wholly preempted the use of natural phenomena.²³⁹ The district court granted Mayo’s motion for summary judgment of invalidity under § 101, but the Federal Circuit reversed.²⁴⁰

The Federal Circuit, believing it was “following the Supreme Court,” applied the *Bilski* “definitive test” for determining whether a process is patent-eligible under § 101: “A claimed process is surely patent-eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.”²⁴¹ Applying the test, the court concluded that the method transformed an article: “[t]he transformation is of the human body following administration of a drug and the various chemical and

235. *Id.* at 1362.

236. In reaching its conclusion the court noted:

Applicants’ method claims are not tied to any concrete parts, devices, or combination of devices. Nor do Applicants’ methods, as claimed, transform any article into a different state or thing. . . . [A]s this court stated in *Bilski*, “[p]urported transformations or manipulations simply of public or private legal obligations or relationships, business risks, or other such abstractions cannot meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances.”

Id. at 1363-64 (alterations in original) (quoting *In re Bilski*, 545 F.3d 943, 963 (Fed. Cir. 2008)).

237. *Prometheus Labs., Inc. v. Mayo Collaborative Servs.*, 581 F.3d 1336, 1339, 1342 (Fed. Cir. 2009), *vacated*, *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 130 S. Ct. 3543 (2010).

238. *Id.* at 1339-40.

239. *Id.* at 1340-41.

240. *Id.* at 1340-41, 1350.

241. *Id.* at 1343 (quoting *In re Bilski*, 545 F.3d 943, 961 (Fed. Cir. 2008)) (internal quotation marks omitted).

physical changes of the drug's metabolites that enable their concentrations to be determined."²⁴²

As illustrated above, the Federal Circuit has attempted, with limited success and notable frustration, to translate the Supreme Court's statements regarding exceptions to the statutory definition of subject matter into practice. Its latest attempt in August of 2012 suggests that there is still an imperfect understanding between the Supreme Court and the Federal Circuit. In *Ass'n for Molecular Pathology v. US Patent & Trademark Office*,²⁴³ the Federal Circuit reconsidered the decision which the Supreme Court had vacated and remanded in *Ass'n for Molecular Pathology v. Myriad Genetics*.²⁴⁴ While acknowledging the Supreme Court's definition of patentable subject matter²⁴⁵ and the rationale behind the definition,²⁴⁶ the Federal Circuit reaffirmed the same decision (by the same vote) that had been vacated and remanded.²⁴⁷ On the issue of the patentability of isolated gene sequences as compositions of matter, the Federal Circuit held that the claimed isolated DNA sequence covered "compositions of matter, expressly authorized as suitable patent-eligible subject matter in § 101."²⁴⁸ Noting that full resolution of the issue under the Supreme Court definition also depended on whether the appellee claimed "patent-ineligible products of nature," the Federal Circuit concluded the appellee did not, holding, "[t]he isolated DNA molecules before us are not found in nature."²⁴⁹ The

242. *Id.* at 1346.

243. *Ass'n for Molecular Pathology v. US Patent & Trademark Office*, 689 F.3d 1303 (Fed. Cir. 2012), *petition for cert. filed*, (Sept. 25, 2012) (No. 12-398).

244. *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 132 S. Ct. 1794 (2012).

245. On rehearing, the Federal Circuit stated:

The Supreme Court, however, has . . . consistently held that § 101, although broad, is not unlimited. The Court's precedents provide three judicially created exceptions to § 101's broad patent-eligibility principles: "Laws of nature, natural phenomena, and abstract ideas" are not patentable. The Court has also referred to those exceptions as precluding the patenting of mental processes.

Ass'n for Molecular Pathology, 689 F.3d at 1324 (citations omitted) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1293 (2012)).

246. The Federal Circuit Court utilized the Supreme Court's definition when it stated, "[t]he relevant distinction for purposes of § 101 is . . . between products of nature . . . and human-made inventions." *Id.* (alteration in original) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 313 (1980)). Additionally, the Federal Circuit stated, "[t]he Court has explained that, although not required by the statutory text, '[t]he concepts covered by these exceptions are "part of the storehouse of knowledge of all men . . . free to all men and reserved exclusively to none."'" *Id.* (quoting *Bilski v. Kappos*, 130 S. Ct. 3218 (2010)).

247. The Federal Circuit also reached the same result as to patentability of the claimed processes, holding those which resulted in a transformed compound patentable and those which merely required observing a correlation not. *Id.* at 1333-34.

248. *Id.* at 1325.

249. *Id.*

court then devoted a significant amount of effort explaining the differences between the claimed isolated sequence and the naturally occurring sequence.²⁵⁰

The dissent read the Supreme Court's decision as compelling the conclusion that "[j]ust as a patent involving a law of nature must have an 'inventive concept' that does 'significantly more than simply describe . . . natural relations,' a patent involving a product of nature should have an inventive concept that involves more than merely incidental changes to the naturally occurring product."²⁵¹ The dissent also criticized the majority's decision as granting overly broad protection, and thereby threatening to foreclose more innovation than is justified under the statute.²⁵²

At a minimum, the opinions on remand demonstrate that the Supreme Court's current subject-matter test is not sufficiently clear to the Federal Circuit to produce a unanimous opinion in a case that the Supreme Court had just itself decided by a unanimous opinion. This is not merely an academic "discussion" between the courts. On the contrary; the uncertainty as to what can be protected and what cannot has an impact on investment decisions, and therefore has a corresponding impact on decisions as to which technologies are investigated and developed and which remain unexplored. This uncertainty and its results might be an acceptable cost to society if there were a countervailing benefit to society. It is therefore fair to ask why the courts perceive a need to intervene on the definition of statutory subject matter, and whether these perceived needs establish such a benefit.

The remainder of the Article will explore both the judiciary's substantive motivation behind such intervention—that is, whether and to what extent the courts truly believe some government actor should make a change—and whether the judiciary is the proper branch of government to do so.

250. *Id.* at 1325-33.

251. *Id.* at 1355 (Bryson, J., dissenting) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1294, 1297 (2012)).

252. The dissent does not think Myriad deserves such broad protection. *Id.* at 1356 (Bryson, J., dissenting) (considering "how much future innovation is foreclosed relative to the contribution of the inventor" and warning of the 'danger' that overly broad patent claims might 'foreclose[] more future invention than the underlying discovery could reasonably justify'" (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1301, 1303 (2012))).

II. WHY JUDICIAL INTEREST IN STATUTORY SUBJECT MATTER?

As discussed above,²⁵³ Congress has both the power and a rational basis for deciding that it is appropriate to limit patent protection to certain categories of invention. In dividing the patentable from the unpatentable, the Constitution does not require optimality, merely a system that Congress designs to promote technological progress through the incentive of a limited-term monopoly.²⁵⁴

The power to fashion such a system is committed to Congress²⁵⁵ and exercised by Congress in Title 35 of the US Code.²⁵⁶ While others might have selected a different balance, the system Congress created certainly promotes progress through the limited-term monopoly incentive it offers.²⁵⁷ Congress has established technology-neutral restrictions on patentable subject matter and has also shown itself capable of providing technology-specific exceptions when it chooses to do so.²⁵⁸

Once Congress has expressed its choice in the statute, the courts have the power to interpret ambiguous statutes and to determine the constitutionality of statutes.²⁵⁹ Given the various sections of the patent statute that are designed to protect the public domain and promote progress,²⁶⁰ and given the clarity and consistency of Congress's definition of statutory subject matter,²⁶¹ what judicial concerns motivate the need to engraft imitations on the broad statutory definition? The following concerns emerge from the cases.

253. See *supra* Part I.A.

254. See *supra* Part I.A.

255. U.S. CONST. art. I, § 8, cl. 8 (“The Congress shall have 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.”).

256. 35 U.S.C. §§ 101-376 (2006).

257. See *Patent*, LEGAL INFO. INST., (Aug. 19, 2010, 5:21 PM), <http://www.law.cornell.edu/wex/patent>.

258. Tax strategy patents and claims “directed to or encompassing a human organism” are specifically excluded from patentability. Leahy-Smith America Invents Act, Pub. L. No. 112-29, §§ 14, 33, 125 Stat. 284, 327-28 (2011) (amending 35 U.S.C. § 101). Nuclear weapons technology is likewise excluded from patentability. 42 U.S.C. § 2181. In addition, Congress has denied remedies for infringement of medical procedure patents. 35 U.S.C. § 287(c)(1).

259. *Marbury v. Madison*, 5 U.S. (1 Cranch) 137, 177-78 (1803).

260. The statute requires novelty, 35 U.S.C § 102, and non-obviousness, 35 U.S.C § 103, as well as enabling disclosure, 35 U.S.C §§ 111-112, and utility, 35 U.S.C § 101, as prerequisites for patentability.

261. The statutory provisions covering patentable subject matter have remained substantively constant from 1790 through the major overhaul of the statute in 2011. See Part I.B, *supra*.

A. To Preclude Patents on “Big Ideas”

The theory underlying the *Funk* and *Benson* cases appears to be that some ideas (i.e., principles of nature) are so far-reaching that patent law cannot allow inventors to monopolize them.²⁶² The rationale finds its most coherent expression in Justice Breyer’s dissent to the dismissal of certiorari in *Labcorp*.²⁶³

Justice Breyer explains that the problem is not that laws of nature are easy, inexpensive, or obvious to discover, but rather that allowing them to be patented grants too much protection and thereby impedes the exchange of information and discourages research.²⁶⁴

There are two problems with Justice Breyer’s rationale. First, it misunderstands the nature of a US patent. Patents are granted only for innovations to which the public did not already have access²⁶⁵ and to which the public would be unlikely to obtain access but for the disclosure by the patent applicant.²⁶⁶ As the Supreme Court noted in 1933 in *Dubilier*:

Though often so characterized a patent is not, accurately speaking, a monopoly, for it is not created by the executive authority at the expense and to the prejudice of all the community except the grantee of the patent. The term “monopoly” connotes the giving of an exclusive privilege for buying, selling, working, or using a thing which the public freely enjoyed prior to the grant. Thus a monopoly takes something from the people. An inventor deprives the public of nothing which it enjoyed before his discovery, but gives something of value to the community by adding to the sum of human knowledge.²⁶⁷

262. *Gottschalk v. Benson*, 409 U.S. 63, 67-68 (1972); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).

263. *Lab. Corp. of Am. Holdings v. Metabolite Labs. Inc.*, 548 U.S. 124, 126 (2006) (Breyer, J., dissenting)

264. The dissent also noted:

The justification for the principle does not lie in any claim that “laws of nature” are obvious, or that their discovery is easy, or that they are not useful. To the contrary, research into such matters may be costly and time-consuming; monetary incentives may matter; and the fruits of those incentives and that research may prove of great benefit to the human race. Rather, the reason for the exclusion is that sometimes *too much* patent protection can impede rather than “promote the Progress of Science and useful Arts,” the constitutional objective of patent and copyright protection.

The problem arises from the fact that patents do not only encourage research by providing monetary incentives for invention. Sometimes their presence can discourage research by impeding the free exchange of information, for example by forcing researchers to avoid the use of potentially patented ideas, by leading them to conduct costly and time-consuming searches of existing or pending patents, by requiring complex licensing arrangements, and by raising the costs of using the patented information, sometimes prohibitively so.

Id. at 126-27 (Breyer, J., dissenting) (citations omitted).

265. 35 U.S.C. § 102 (2006).

266. *Id.* § 103.

267. *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186 (1933) (footnote omitted).

The inventor takes nothing from the public. In fact, by accepting a patent, the inventor adds to public knowledge:

He may keep his invention secret and reap its fruits indefinitely. In consideration of its disclosure and the consequent benefit to the community, the patent is granted. . . . [U]pon the expiration of that period, the knowledge of the invention inures to the people, who are thus enabled without restriction to practice it and profit by its use.²⁶⁸

Second, this rationale is extraordinarily bad policy. The greater the discovery, the greater the value derived from its disclosure. Since a patent may claim only what the inventor has discovered and can teach others how to make and use,²⁶⁹ disclosure of a “big idea” does not “imped[e] the free exchange of information,”²⁷⁰ but rather provides the starting point for others to investigate, foreclosing them only from what the inventor can already explain how to do.

Holding that “[p]henomena 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” presumes a fixed and ascertainable distinction between basic tools and other tools, a distinction that clearly depends on the state of technology and changes over time.²⁷¹ An eighteenth-century researcher would not have considered quantum theory a “basic tool.”²⁷² A twenty-first-century researcher would, but only because an intervening inventor uncovered, developed, and disclosed the information that made it a “basic tool.”²⁷³ The fundamental theory of patent law is that the reward of a limited-term monopoly encourages disclosure of what might otherwise be kept secret.²⁷⁴ Denying that reward might discourage disclosure, thereby leaving a “fundamental tool” unknown and unexploited by future scientists.²⁷⁵ Likewise, discoveries would not become “part of the storehouse of knowledge” unless a discoverer decided to disclose them.²⁷⁶

268. *Id.* at 186-87.

269. *See* 35 U.S.C. § 112 (2006).

270. A patent only precludes manufacture, use, sale or importation—not thought or discussion. *See id.* § 271.

271. *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

272. *See generally* MAX PLANCK, *THE ORIGIN AND DEVELOPMENT OF THE QUANTUM THEORY 1* (Ludwik Silberstein & Hans Thacher Clarke, trans., Oxford at the Clarendon Press 1922).

273. *Id.*

274. *See* U.S. CONST. art. I, § 8, cl. 8.

275. *See id.*

276. Andrew Beckerman-Rodau, *Patents Are Property: A Fundamental But Important Concept*, 4 J. BUS. & TECH. L. 87, 93 (2009).

B. To Prevent Premature Patent Monopolies

A closely related concern is that patents may be granted to incompletely developed ideas, foreclosing further development during the term of the patent.²⁷⁷ As Justice Breyer points out in his dissent in *Labcorp*, finding the right balance between incentive and overprotection is important in order to avoid stifling innovation.²⁷⁸

Again, there are two flaws in this rationale. First, while it is true that finding the correct balance is important, the Constitution commits the responsibility of finding that balance to Congress.²⁷⁹ Second, Congress has already struck such a balance: 35 U.S.C. §§ 101 and 112.²⁸⁰ If an inventor has grasped only the scientific principle, but not a specific use, the 35 U.S.C. § 101 utility requirement will preclude patentability.²⁸¹ If an inventor has appreciated only part of the implications of a new discovery, the 35 U.S.C. § 112 requirement that claims must be commensurate with the inventor's disclosure will limit the scope of the patent—the inventor will obtain patent protection only for what is in hand as evidenced by an enabling written description.²⁸²

C. To Prevent Withdrawing "Things that 'Everybody' Knows" from the Public Domain

The Federal Circuit decision in *Alappat* reflects an approach, since discredited, that treats mathematical algorithms and laws of nature as generally known, and it looks to see if anything patentable remains once the court removes these publicly known elements from the claims.²⁸³ The Supreme Court has rejected this approach, cautioning against dissecting claims which should be treated as a whole.²⁸⁴ Furthermore, Congress has provided a better tool for protecting the public domain: 35 U.S.C. §§ 102 and 103, which deny patentability to claims that are not new, or which are obvious advances over what the public already possesses.²⁸⁵

277. See Sarnoff, *supra* note 19, at 106.

278. *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.* 548 US 124, 127 (2006) (Breyer, J., dissenting).

279. See David W. Barnes, *The Incentives/Access Tradeoff*, 9 NW. J. TECH. & INTELL. PROP. 96, 97 (2010).

280. 35 U.S.C. §§ 101, 112 (2006).

281. *Id.* § 101.

282. *Id.* § 112.

283. *In re Alappat*, 33 F.3d 1526, 1557 (Fed. Cir. 1994).

284. See *Diamond v. Diehr*, 450 U.S. 175, 188 (1981).

285. 35 U.S.C. §§ 102, 103.

D. To Promote Efficiency in the Patent Office's Evaluation of Applications

The Patent Office is charged with evaluating applications to ensure that they meet all of the requirements of the statute before they are issued as US patents.²⁸⁶ Joshua Sarnoff argues that applying § 101 exceptions as a threshold requirement will reduce administrative costs and the overall burden on the patent system.²⁸⁷ Michael Risch argues that “abandoning subject matter restrictions in favor of rigorous application of patentability requirements will not necessarily lead to more patents in controversial areas.”²⁸⁸

To be sure, some of the statutory requirements are more difficult and time-consuming to evaluate than others. For example, the 35 U.S.C. §§ 102 and 103 requirements can be tested only by first establishing the state of the art, an often time-consuming exercise, and one which cannot be done with complete assurance.²⁸⁹ The patent examiner may miss a publicly available document—for example, it may be written in a foreign language or available only from an obscure source. The difficulty of evaluation and risk of oversight is arguably greater with respect to emerging technologies because the literature is less organized, and much of it may still be unpublished.²⁹⁰ Thus, one might argue, excluding broad categories of early-stage inventions would save the Patent Office time, and reduce the risk of granting a patent that ultimately turns out to be invalid.²⁹¹ It would, however, do so at the cost of removing the incentive of a patent from broad areas of inquiry.

Moreover, while the efficiency argument may have theoretical appeal, it does not reflect the manner in which the Patent Office actually operates, nor does it provide additional efficiencies in litigation.²⁹² Under its rules, the Patent Office instructs examiners to

286. See U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 702 (8th ed. rev. 8, 2010).

287. Sarnoff, *supra* note 19, at 106.

288. Michael Risch, *Everything is Patentable*, 75 TENN. L. REV. 591, 595 (2008).

289. 35 U.S.C §§ 102, 103; see U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE §§ 2121-2141.

290. Notice of Public Hearing and Request for Comments on Issues Related to the Identification of Prior Art During the Examination of a Patent Application, 64 Fed. Reg. 28,803, 28,804 (May 27, 1999).

291. An issued patent is presumed valid, but if it can be shown that the patent was issued because the examiner was unaware of a relevant prior art document the presumption can be overcome and the patent invalidated. See *Radio Corp. of Am. v. Radio Eng'g Labs.*, 293 U.S. 1, 7 (1934).

292. See U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 2106.

begin the substantive review of an application with an examination of the prior art, not with an evaluation of patentable subject matter.²⁹³ Under current “compact prosecution” practice, examiners are instructed to consider all obstacles to patentability in the first substantive response to the applicant.²⁹⁴

Likewise, since a patent claim is invalid if it fails to meet any one of the statutory requirements, a court is free to choose which statutory barrier to focus on first and, having found one that bars patentability, is free to stop its analysis at that point.²⁹⁵

Thus, unless the Patent Office also changes its practices, imposing additional statutory subject-matter requirements beyond those Congress has already set would not increase efficiency, either at the Patent Office or in the courts.

III. JUSTIFYING JUDICIAL INTERVENTION

Judge Rader, dissenting in *Bilski*, raises a critical question:

With all of its legal sophistry, the [Federal Circuit] court’s new test for eligibility today does not answer the most fundamental question of all: *why* would the expansive language of section 101 preclude protection of innovation simply because it is not transformational or properly linked to a machine (whatever that means)? Stated even more simply, why should some categories of invention deserve no protection?²⁹⁶

There are two possible approaches to answering this question, two types of justifications for judicial introduction of exceptions to the statutory language of 35 U.S.C. § 101: (1) either the statute is ambiguous and requires interpretation; or (2) the statute, although clear, must be limited as a matter of constitutional law. The justification matters: if it is constitutionally mandated, then Congress is without power to make a contrary policy judgment; if it is merely a matter of statutory interpretation, then if Congress concludes that a different interpretation is preferable, Congress (and most appropriately Congress) can adjust the language to further the policy it desires.²⁹⁷

A. Statutory Command

The language of 35 U.S.C. § 101 does not appear ambiguous on its face. It lists four categories of statutory subject matter and does not exclude “phenomena of nature, mental processes, or abstract

293. *See id.*

294. *See id.*

295. *See* 35 U.S.C. §§ 101-104 (2006).

296. *In re Bilski*, 545 F.3d 943, 1012 (Fed. Cir. 2008).

297. *See* U.S. CONST. art. I, § 8, cl. 18.

intellectual concepts.”²⁹⁸ Congress has apparently had no difficulty excluding specific types of inventions that would otherwise fit within the four broad statutory categories and has done so most recently in the 2011 America Invents Act.²⁹⁹ The Supreme Court cautioned in *Dubilier*,³⁰⁰ and repeated in *Chakrabarty*, that courts “should not read into the patent laws limitations and conditions which the legislature has not expressed.”³⁰¹ In *Chakrabarty*, the Court explained its role as follows:

Congress has performed its constitutional role in defining patentable subject matter in § 101; we perform ours in construing the language Congress has employed. In so doing, our obligation is to take statutes as we find them, guided, if ambiguity appears, by the legislative history and statutory purpose.³⁰²

In a concurring opinion in *Arrhythmia Research*, Judge Rader observed that, in *Benson*, the Supreme Court read into 35 U.S.C. § 101 “a limitation not found in the statute,” noting no fewer than four times that the limitation cannot be found in, or reasonably inferred from, the statutory language.³⁰³

The Supreme Court cases provide no argument that the terms “machine,” “manufacture,” “composition of matter,” or “process” are ambiguous.³⁰⁴ In fact, in reviewing the changes over the more than two-hundred-year history of the statute, the Court has found a consistency in the meaning of these terms.³⁰⁵ If there is a justification for judicial intervention, then it must arise as a matter of Constitutional necessity.

298. 35 U.S.C. § 101.

299. Leahy-Smith America Invents Act, Pub. L. No. 112-29, §§ 14, 33, 125 Stat. 284, 327-28 (2011) (amending 35 U.S.C. § 101) (declaring tax strategies within the prior art and thereby excluding them from patentability and declaring human organisms unpatentable).

300. *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199 (1933).

301. *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980).

302. *Id.* at 315.

303. *Arrhythmia Research Tech. v. Corazonix*, 958 F.2d 1053, 1061-62 (Fed. Cir. 1992) (Rader, J., concurring). The court wrote:

[1] The language of section 101 conveys no implication that the Act extends patent protection to some subcategories of machines or processes and not to others. [2] The limits on patentable subject matter within section 101 focus not on subcategories of machines or processes, but on characteristics, such as newness and usefulness. . . .

[3] [T]he language of the Patent Act does not suggest that the words “machine” or “process” carry limitations outside their ordinary meaning. . . . [4] Rather the Act, by its terms, extends patent protection to “any” machine or process which satisfies the other conditions of patentability.

Id.

304. See e.g., *Chakrabarty*, 447 U.S. at 303; *Dubilier* 289 U.S. at 178; *Arrhythmia*, 958 F.2d at 1053.

305. See discussion of statutory history, *supra* Part I.A.

B. Constitutional Requirement

If there is an underlying constitutional mandate that “phenomena of nature, mental processes, or abstract intellectual concepts” must be excluded from the reach of 35 U.S.C. § 101, the Supreme Court has not articulated it.³⁰⁶

While never explicitly called upon to rule on the constitutionality of § 101, the Court has frequently commented on the section without expressing any doubt as to its constitutionality. As early as *McClurg v. Kingsland*, the Court held that “the powers of Congress to legislate upon the subject of patents is plenary by the terms of the Constitution.”³⁰⁷ The statement in *Chakrabarty* that “Congress has performed its constitutional role in defining patentable subject matter in § 101” certainly suggests that there is no constitutional requirement to modify the language of the statute.³⁰⁸ The statement in *Labcorp* that “the reason for the exclusion is that sometimes too much patent protection can impede rather than ‘promote the Progress of Science and useful Arts,’” after conceding that “research into such matters may be costly and time-consuming . . . and that research may prove of great benefit to the human race,” is a criticism of line-drawing, rather than a constitutional shortcoming.³⁰⁹ The Constitution charges Congress with promoting progress, not finding a hypothetical optimal point of promotion.³¹⁰

IV. POLICY

The extensive history of the inconstancy of judicial exclusions from the clear statutory language of 35 U.S.C. § 101 and the difficulty of the lower courts in interpreting the exclusions are powerful arguments that such judicial intervention is unwise. The uncertainty created by this interference with Congress’s policy determination raises costs to participants and to society in general. It raises both processing costs at the patent prosecution stage and costs of litigation necessitated by uncertainty. It also raises costs to society, which, although unquantifiable, are also undeniable; uncertainty discourages

306. See *McClurg v. Kingsland*, 42 U.S. (1 How.) 202, 206 (1843); see also *Chakrabarty*, 447 U.S. at 315.

307. *McClurg*, 42 U.S. at 206.

308. *Chakrabarty*, 447 U.S. at 315.

309. *Lab. Corp. of Am. Holdings v. Metabolite Labs.*, 548 U.S. 124, 126-27 (2006) (Breyer, J., dissenting) (emphasis omitted).

310. See U.S. CONST. art. I, § 8, cl. 8.

investment in all emerging technologies, including those technologies of greatest potential value.³¹¹

The fact that neither the Federal Circuit nor even some members of the Supreme Court can fathom the limits of patentable subject matter should be motivation enough to put an end to judicial intervention.³¹² The Court has had to address the issue of statutory subject matter directly³¹³ and tangentially³¹⁴ more than a dozen times and has never been able to reach a unanimous decision.³¹⁵

Admittedly, some parties may benefit from ambiguity. To the extent that there is doubt as to the availability of patent protection, some inventors will be motivated to forego the cost and effort of applying for a patent.³¹⁶ To the extent that there is doubt as to the validity of a patent, some patentees will be motivated to forego the cost and effort of infringement litigation. Thus, some infringers will, in fact, benefit from ambiguity at the expense of inventors and patentees. These are not, however, the parties whose interests the Constitution charges Congress to “promote” in Article I, Section 8.³¹⁷

The recent *Golan* case might suggest otherwise. In justifying the extension of copyright protection to public domain works, Justice Ginsburg noted that motivating creation of works of authorship was not the sole goal of the Intellectual Property Clause. “Evidence from the founding, moreover, suggests that inducing *dissemination*—as opposed to creation—was viewed as an appropriate means to promote science.”³¹⁸

311. See Jonathan Levin & Richard Levin, *Benefits and Costs of an Opposition Process*, in *PATENTS IN THE KNOWLEDGE-BASED ECONOMY* 120, 122 (Wesley M. Cohen & Stephen A. Merrill eds., 2003).

312. See, e.g., *Bilski v. Kappos*, 130 S. Ct. 3218, 3231 (2010) (Stevens, J., concurring).

313. See *Le Roy v. Tatham*, 55 U.S. (14 How.) 156 (1853); see also *Bilski*, 130 S. Ct. at 3218; *Labcorp*, 548 U.S. at 124; *Diamond v. Diehr*, 450 U.S. 175 (1981); *Diamond v. Chakrabarty*, 447 U.S. 303 (1980); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63 (1972); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948); *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86 (1939); *McClain v. Ortmyer*, 141 U.S. 419 (1891); *Tilghman v. Proctor*, 102 U.S. 707 (1881); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498 (1874); *Corning v. Burden*, 56 U.S. 252 (1853); *O’Reilly v. Morse*, 56 U.S. 62 (1853).

314. See, e.g., *Dann v. Johnston*, 425 U.S. 219 (1976); *United States v. Dubilier Condenser Corp.*, 289 U.S. 178 (1933).

315. See *supra* note 313.

316. Foregoing patent protection will usually mean maintaining trade secrecy, imposing a cost on society. See generally, e.g., Shawn McDonald, *Patenting Floppy Disks, or How the Federal Circuit’s Acquiescence Has Filled the Void Left by Legislative Inaction*, 3 VA. J.L. & TECH. 9 (1998) (discussing that during a period when patentability of software inventions was uncertain, software inventors chose trade secrecy or copyright protection—which permitted preservation of trade secrets—rather than risk applying for patents).

317. See U.S. CONST. art. I, § 8, cl. 8.

318. *Golan v. Holder*, 132 S. Ct. 873, 888 (2012). Note, however, that this argument related to the dissemination of ideas through publication of copyrightable works, not

In fact, the very argument that judicial exceptions are necessary to prevent monopolization of emerging technologies proves the opposite—without the disclosure of the discovery, the field would not even exist.³¹⁹ If the uncertainty introduced by judicial exceptions makes financing unavailable, or motivates innovators to look elsewhere, then the field will not develop, increasing the cost to society more than any conceivable cost that might be imposed by a limited-term monopoly.³²⁰ Even if innovators still choose to innovate without the patent incentive, they will be forced, in the absence of patent protection, to rely on trade secret protection instead.³²¹ This will work “against the developers and even society as a whole. Rather than promoting information exchange and technological innovation, trade secrecy encourages developers to hoard their inventions; this forces software developers to ‘spend much of their efforts reinventing the wheel’”³²² It would be hard to construct an argument that the goal of the Intellectual Property Clause is to encourage secrecy.

V. A PROPOSED SOLUTION

The fundamental problem with the current judicial limitations on statutory subject matter is not so much the exclusion or inclusion of certain types of inventions, but rather the ambiguity and uncertainty which results from judicial intervention in a policy decision. Congress should reassert its role as policy maker.

If Congress concludes that phenomena of nature, mental processes and abstract intellectual concepts should not be patentable, revising the statute to explicitly exclude these categories from patentability would remove a source of ambiguity and improve the efficiency of the patent system.³²³ More importantly, it would return

dissemination of products incorporating patentable inventions. The function of disseminating ideas is served with respect to patents by publication of the patent, which by virtue of 35 U.S.C. § 112 must contain enough information to teach how to make and use the invention. See 35 U.S.C. § 112 (2006).

319. See *supra* Part II.D.

320. The argument might be made that some other innovator will eventually make the same invention. Not only is this speculative, but if it is true that it is likely that someone else would come up with the same idea, the invention would probably be unpatentable under the obviousness standard of 35 U.S.C. § 103.

321. See Chad King, Note, *Abort, Retry, Fail: Protection for Software-Related Inventions in the Wake of State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 85 CORNELL L. REV. 1118, 1157-58 (2000).

322. *Id.* at 1159-60 (quoting Lee A. Hollaar, *Justice Douglas Was Right: The Need for Congressional Action on Software Patents*, 24 AIPLA Q.J. 283, 286 (1996)).

323. Congress took just such a step in 1952 when it added § 103 to the patent statute, codifying the judicially created principle of rejecting patents on obvious advances. See 35 U.S.C. § 103; *Graham v. John Deere Co.*, 383 U.S. 1, 3 (1966).

the policy decision to the branch to which it was committed by the Constitution.

If Congress concludes that judicial intervention is contrary to its policy decision as reflected in the language it chose for 35 U.S.C. § 101, it has the power to act. Judicial intervention is not constitutionally mandated. While it might seem odd to single out certain items as included within what otherwise appears to be a broad and open-ended definition, the Supreme Court's foray into patent policy makes such a step necessary. A simple statutory amendment—adding, for example, the words “including phenomena of nature, mental processes, or abstract intellectual concepts which otherwise meet the requirements of this statute”—would solve the problem.

Even if Congress concludes that there is no harm at the moment, it is difficult to predict how the judicial restrictions might affect the development of emerging or future technologies. For example, no one would suggest that current machines are products of nature—they are too complex and too clearly manmade. As nanotechnology develops and the concept of machine approaches the molecular scale, the dividing line may become less obvious.

The impact on currently unforeseen technologies is even harder to predict. The risk of a limited-term monopoly would seem less costly to society than the risk of the permanent loss of a valuable technology because the technology is never developed. Reasonable people could disagree on which risk is preferable and where, as a matter of policy, Congress should draw the line between the patentable and the unpatentable. What seems beyond reasonable disagreement, however, is that Congress is the appropriate branch of government to decide the policy matter and draw that line.

