

*BILSKI AND THE AMBIGUITY OF
“AN UNPATENTABLE ABSTRACT IDEA”*

by
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In Bilski v. Kappos, the Supreme Court affirmed the PTO’s rejection of a number of patent claims under the patent-eligibility provision of section 101 of the Patent Act. In doing so, however, the Court shifted the doctrinal ground of the rejection from the ground relied upon below, holding that the claims were not eligible for patent protection because they described abstract ideas. However, the Court provided nothing but conclusory reasoning to support its abstract-ideas holding. Bilski breaks new ground in positioning the abstract-ideas doctrine as the primary gatekeeper of patent eligibility for many types of claims, but it teaches the patent community almost nothing about what constitutes an unpatentable abstract idea or how to identify an unpatentable abstract idea in the future.

This Article outlines one strategy for doing what the Supreme Court chose not to do, namely giving meaningful content to the exclusion of abstract ideas from patent eligibility. Conventionally, the principal problem with the abstract-ideas doctrine of section 101 is understood to be vagueness: abstraction is a continuous variable, and the dividing line that differentiates unpatentable abstractions from patentable applications is known to be difficult to identify with precision. While vagueness is a real issue, this Article argues that there is a more fundamental problem that must be addressed prior to vagueness. The phrase “an unpatentable abstract idea” is multiply ambiguous, as the phrase invokes entirely different concepts in different situations. Examining Supreme Court and Federal Circuit precedent prior to Bilski, this Article argues that “an unpatentable abstract idea” means four different things in four different contexts, and it thereby identifies four distinct types of unpatentable abstract ideas that may merit different treatment under the doctrine of patent eligibility.

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I. INTRODUCTION

*The Court, in sum, never provides a satisfying account of what constitutes an unpatentable abstract idea. . . . The Court essentially asserts its conclusion that petitioners' application claims an abstract idea. This mode of analysis (or lack thereof) may have led to the correct outcome in this case, but it also means that the Court's musings on this issue stand for very little.*¹

In *Bilski v. Kappos*, the Supreme Court addressed the eligibility of a series of methods of hedging risk in particular markets and using particular types of contracts for patent protection.² As the Court of Appeals for the Federal Circuit had done in its en banc opinion below, the Supreme Court affirmed the rejection of these claims by the Patent and Trademark Office (PTO) under the patent-eligibility provision of section 101 of the Patent Act.³ In doing so, however, the majority opinion relied on a new doctrinal basis for its rejection. The Federal Circuit had interpreted section 101 to mandate a “machine-or-transformation” test as the sole test for patent eligibility.⁴ The five-justice majority opinion expressly held that the Federal Circuit’s test was not the *sole* test for patent eligibility,⁵ and it implicitly reduced the importance of the test yet further by ignoring the test thereafter. It refrained from commenting on whether the Federal Circuit’s application of the machine-or-transformation test to the claims at issue was proper or useful in this particular context or, if proper and useful, whether the application was properly done. Instead, drawing on an oft-repeated aphorism in its precedent, the Court held that the claims were not patentable subject

¹ *Bilski v. Kappos*, 130 S. Ct. 3218, 3236 (2010) (Stevens, J., concurring).

² *Id.* at 3223–24 (majority opinion).

³ *Id.* at 3229–31.

⁴ *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc), *aff'd on other grounds*, 130 S. Ct. 3218 (2010).

⁵ *Bilski*, 130 S. Ct. at 3225–28.

matter because they described abstract ideas.⁶ In a parallel move, a four-justice concurrence also rebuffed the Federal Circuit’s machine-or-transformation test and argued that the claims were unpatentable because section 101 categorically excluded methods of doing business from the patent regime.⁷ In sum, the majority opinion in *Bilski* both breaks from the other *Bilski* opinions and breaks new ground in positioning the abstract-ideas doctrine as the primary gatekeeper of patent eligibility.

In the passage quoted above, however, the concurring opinion by Justice Stevens frames the question that the majority opinion leaves in its wake for the patent community: What constitutes an unpatentable abstract idea under section 101 of the Patent Act? Beyond specifying that *Bilski*’s claims in particular are unpatentable abstract ideas, the majority opinion offers little guidance.⁸ The opinion does summarize the facts of *Gottschalk v. Benson* and *Parker v. Flook*, the two most recent Supreme Court cases to hold that patent claims recite unpatentable abstract ideas.⁹ It also proclaims that “[t]he concept of hedging . . . is an unpatentable abstract idea, just like the [mathematical] algorithms at issue in *Benson* and *Flook*.”¹⁰ However, the comparison stands as a bald and unreasoned assertion. The majority opinion does not even attempt to explain why the concept of hedging and a mathematical algorithm are “just like” each other. Perhaps because the majority opinion recognizes that it does not explain its reasoning, it falls back onto a consensus-based justification for its holding, noting that “all members of the Court agree that the patent application at issue here falls outside of § 101 because it claims an abstract idea.”¹¹ But, standing alone, such a consensus-based justification represents an open embrace of an “I know it when I see it” jurisprudence at the Supreme Court,¹² and it offers no prospective guidance for the patent community.

In all likelihood, the sparse and incomplete exposition of what constitutes an unpatentable abstract idea was the result of a strategic choice rather than an oversight. Reliance on the notion of an unpatentable abstract idea was probably intended as a politically

⁶ *Id.* at 3229–31. Judge Rader relied on a similar doctrinal basis in his dissent (which technically should be a concurrence) in the Federal Circuit. *In re Bilski*, 545 F.3d at 1011–15 (Rader, J., dissenting).

⁷ *Bilski*, 130 S. Ct. at 3231–57.

⁸ See Joseph Scott Miller, *Introduction*, 15 LEWIS & CLARK L. REV. 1, 7 (2011) (describing the Supreme Court’s rationale for labeling the *Bilski* claims as unpatentable abstract ideas as “more a gesture than an analysis”).

⁹ *Bilski*, 130 S. Ct. at 3230.

¹⁰ *Id.* at 3231.

¹¹ *Id.* at 3230.

¹² *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (arguing that “hard-core pornography” was not protected by the First Amendment, conceding that it was difficult to define, and justifying his ability to identify it with the argument that “I know it when I see it.”).

expedient way for the Court to invalidate the claims at issue in *Bilski* with a “narrowly” crafted holding and thus to resolve the case while creating as few waves as possible.¹³ Yet, whatever the motivation for the Court’s decision to establish the prohibition on the patenting of abstract ideas as the primary doctrinal gatekeeper of patent eligibility, the job now confronting the Federal Circuit, the district courts, and the PTO is daunting. These institutions must move forward and do what the Supreme Court avoided doing. Unlike the Court, they cannot blatantly assert that an unpatentable abstract idea is whatever *they* think it is. Nor can they all be strategically incomplete in their analysis and punt the important questions about what constitutes an abstract idea to other decision-making institutions.¹⁴ There has to be a bottom rung on the ladder somewhere. It cannot be turtles all the way down.¹⁵

Rather than rehashing the lead-up to *Bilski* or the disagreement between the majority and concurring opinions, this Article focuses on moving forward after *Bilski*. It outlines one possible strategy for doing what the Court chose not to do, namely generating an analytically coherent definition of what constitutes an unpatentable abstract idea and thereby avoiding an “I know it when I see it” jurisprudence.¹⁶ Contemporary theories about what constitutes an unpatentable abstract

¹³ *Bilski*, 130 S. Ct. at 3229 (“Rather than adopting categorical rules that might have wide-ranging and unforeseen impacts, the Court resolves this case narrowly on the basis of this Court’s decisions in *Benson*, *Flook*, and *Diehr* . . .”). The exclusion of abstract ideas from the patent regime is a well established non-statutory exclusion from patent eligibility, and long-recognized non-statutory exclusions are apparently easier to swallow than newly articulated non-statutory exclusions such as either the machine-or-transformation test proposed by the Court of Appeals for the Federal Circuit in its opinion below or the per se exclusion of business methods outlined in the concurring opinion of Justice Stevens. *Id.* at 3225 (relying on stare decisis to justify the exclusion of abstract ideas from patent eligibility).

¹⁴ *Cf.* Peter Lee, *Patent Law and the Two Cultures*, 120 YALE L.J. 2 (suggesting that the Supreme Court should be required to disclose enough information to enable lower courts to implement their patent opinions).

¹⁵ STEPHEN HAWKING, *A BRIEF HISTORY OF TIME 1* (1988).

¹⁶ This strategy seeks to define the notion of an unpatentable abstract idea in a manner that is amenable to analytical rigor, but courts may be uninterested in such rigor. Over time, *Bilski* may come to stand for nothing more than a wildcard that courts can use to invalidate claims that smell funny for one unarticulated reason or another. (I thank Chris Holman for the apt term “wildcard.”) For example, some claims to abstract ideas may form a penumbra of the exclusions from patentability generated by other statutory provisions. *Bilski*, 130 S. Ct. at 3225 (noting that while the exclusion of abstract ideas from patent-eligibility is “not required by the statutory text,” it is “consistent with the notion that a patentable process must be ‘new and useful’”). After *Bilski*, courts may invoke the patent ineligibility of abstract ideas to invalidate claims that are obvious-ish—claims that seem intuitively obvious to the courts but for which no formal case proving obviousness has yet been mounted. *Id.* at 3231 (noting that the “basic concept of hedging . . . [‘]is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class”) (quoting *In re Bilski*, 545 F.3d 943, 1013 (Fed. Cir. 2008) (en banc), (Rader, J., dissenting), *aff’d on other grounds*, 130 S. Ct. 3218 (2010)).

idea usually share a common assumption: They presume that there is a singular notion of an unpatentable abstract idea. The notion may be fuzzy around its edges, but there is presumptively a coherent core of unpatentable claims to abstract ideas at its center.¹⁷ This Article abandons this assumption. It argues that the phrase “an unpatentable abstract idea” invokes a handful of distinct concepts. In other words, the strategy for the lower courts and the PTO moving forward must initially be to recognize that they face two distinct and compounding difficulties in defining the set of claims that describe unpatentable abstract ideas: vagueness and ambiguity.¹⁸ Vagueness—the problem that is already recognized in the patent literature¹⁹—is a problem of fuzzy concepts whose boundaries are defined by a grey zone rather than a sharp line. Driving too fast for personal safety is a vague concept; driving faster than 65 miles per hour is not. In contrast, ambiguity is a property of language. Ambiguous language can invoke any one of a number of distinct concepts. The phrase “a hot car” can mean a car that has been sitting in the sun, a stylish car, or a stolen car. These concepts have little in common (except that they all involve cars), and the only way to determine which concept the phrase invokes is to examine the context in which the phrase is used (or to seek clarification from the speaker, if there is a speaker who can be questioned). What has not, to date, been sufficiently addressed is that the phrase “an unpatentable abstract idea” is ambiguous as it has been used in Federal Circuit and Supreme Court precedent.²⁰ In fact, it is multiply ambiguous. Like the phrase “a hot car,”

¹⁷ In its *Bilski* opinion, the Federal Circuit took the drive to unification one step further, arguing that the machine-or-transformation test was the sole test for identifying unpatentable process claims involving “laws of nature, natural phenomena, and abstract ideas.” *In re Bilski*, 545 F.3d at 952 n.5 (lumping all of these concerns together under the title of “fundamental principles”).

¹⁸ See D. ALAN CRUSE, MEANING IN LANGUAGE: AN INTRODUCTION TO SEMANTICS AND PRAGMATICS 51–52, 108 (defining vagueness and ambiguity).

¹⁹ See, e.g., *Parker v. Flook*, 437 U.S. 584, 589 (1978) (“The line between a patentable ‘process’ and an unpatentable ‘principle’ is not always clear.”).

²⁰ One notable exception to the norm of searching for a unitary definition of an unpatentable abstract idea is the Federal Circuit’s analysis in *In re Comiskey*, 554 F.3d 967, 978–80 (Fed. Cir. 2009) (teasing out “two distinct (though related) aspects” of “[t]he prohibition against the patenting of abstract ideas”). Although the divide-and-conquer, disambiguation approach to unpatentable abstract ideas in *Comiskey* is laudable, the specifics of the Federal Circuit’s analysis in *Comiskey* are of little value moving forward. The categories of unpatentable abstract ideas actually identified continue to elide important distinctions. See, e.g., *id.* at 978 n.12 (equating “an abstract concept or algorithm,” even if executed on a computer, with “a mental process”). Professor Tun-Jen Chiang has also argued that patent eligibility doctrine in general comes in two distinct types: rules of categorical exclusion and standards for limiting claim scope. See generally Tun-Jen Chiang, *The Rules and Standards of Patentable Subject Matter*, 2010 WIS. L. REV. 1353 [hereinafter Chiang, *Rules and Standards*]. However, Professor Chiang’s taxonomy hinges on the nature of the patent disclosure, not the nature of real-world instances of allegedly infringing embodiments. See *infra* note 59.

it can mean several distinct things in several distinct contexts. Consider the following four idealized patent claims:

1. I claim a method comprising the mental act of understanding that [a very specific amount of] inflammation of the gums is correlated with [a very specific percentage] increase in the likelihood of cardiovascular disease.
2. I claim a method of binding sheets of paper together without creating any holes in said paper, regardless of the instrumentality employed to achieve this end.
3. I claim a method of originating mortgages in which (a) a mortgage is originated and (b) said mortgage is immediately securitized, said securitization being achieved through the following series of [highly specified and very narrowly drawn] steps . . .
4. I claim a method of operating a programmed computer comprising executing a never-before conceived or used mathematical algorithm.

In light of Supreme Court and Federal Circuit case law, an examiner or judge would not only be very likely to label each and every one of these claims as an unpatentable abstract idea, but she could also reasonably identify each and every claim as a paradigm example of an unpatentable abstract idea. Yet, these four paradigm examples share few, if any, properties other than the common label. Claim 1 describes an unpatentable abstract idea solely because it describes a mental process in isolation. Claim 2 merits the label not because it describes human thought but rather because it is extremely broad and reaches far beyond the technologies disclosed in the specification (assume it is the paper clip that is disclosed) and deep into after-arising technologies. The crux of the issue in Claim 3 is intangibility, not human thought or over-breadth. It is the centrality of a newly discovered “law of nature” that is the bugaboo in Claim 4, not human thought, over-breadth, or intangibility. The fact that all four of these claims are paradigm examples of a claim to an unpatentable abstract idea proves that the phrase “an unpatentable abstract idea” is multiply ambiguous. The phrase means entirely different things in different contexts. This Article identifies four distinct concepts, corresponding to the four claims discussed above, that the phrase “an unpatentable abstract idea” has been used to invoke in judicial and academic commentary on section 101 of the Patent Act prior to the Supreme Court’s decision in *Bilski*.²¹

This Article also addresses why the project of identifying the distinct concepts that the phrase “unpatentable abstract idea” can invoke is a

²¹ To avoid confusion and make patent law more accessible to the uninitiated, one could reasonably argue that the distinct concepts of an unpatentable abstract idea should be given distinct labels and should not all be referred to with an umbrella term. However, the labels that we apply to the distinct concepts raise an issue of semantics. The fact that we understand them as distinct problems is what is most critical.

worthwhile undertaking. As an initial matter, recognizing that there are several distinct concepts harbored under the umbrella term “an unpatentable abstract idea” is necessary if judges, litigants, examiners, and scholars are to communicate about what does and should constitute an unpatentable abstract idea. If you mean one thing when you say “a hot car,” and I mean another, and, furthermore, we do not recognize that we mean different things, attempts at rational dialog will quickly devolve into head-scratching and intractable disagreement. To get beyond an “I know it when I see it” jurisprudence on unpatentable abstract ideas, establishing greater precision in the language used to discuss patent eligibility is a critical first step. In addition to simply enabling communication, the project of identifying the distinct concepts invoked by the phrase “an unpatentable abstract idea” holds the promise of facilitating the creation of patent doctrine that is better able to achieve the utilitarian, constitutionally specified goal of “promot[ing] the Progress of . . . useful Arts.”²² If they were to be sanctioned, patents on the distinct types of abstract ideas would be problematic for different normative reasons. Under a single banner, the prohibition on the patenting of abstract ideas is being used in distinct cases to enforce distinct social policies. Identifying and clarifying the distinct meanings of the phrase “an unpatentable abstract idea” is therefore a useful exercise if the doctrine of patent eligibility is to be firmly moored to its policy justifications. Furthermore, the doctrinal rules needed to tailor the exclusion from patent eligibility to these normative justifications—that is, to distinguish claims to problematic, unpatentable abstract ideas from claims to run-of-the-mill, patentable non-abstract ideas—is likely to be different for each type of unpatentable abstract idea. Disambiguation eliminates the need for a one-size-fits-all response and permits the nuanced tailoring of the doctrine of patent eligibility. In response to normative arguments of varying strengths, prohibitions on the patenting of some types of abstract ideas could grow more robust even as prohibitions on other types remain modest or even wither on the vine. On a related note, the prohibitions on the patenting of some types of abstract ideas under section 101 can be recognized as largely or entirely redundant of the restrictions on patentability established in sections 102, 103, and 112, even as prohibitions on other types of abstract ideas are recognized as doing substantive work that other patentability doctrines cannot do with any reasonable degree of efficacy. In sum, the different types of unpatentable abstract ideas present distinct challenges for the reach of patent eligible subject matter, and the distinct challenges are best addressed with individualized attention. Importantly, the project of identifying the distinct meanings of the phrase “an unpatentable abstract idea” is orthogonal to arguments about whether patentable subject matter should be limitless or bounded or, presuming it should be bounded, about the best way to bound it. The project enables intelligent

²² U.S. CONST. art. I, § 8, cl. 8.

conversations about the desired substantive ends and the means of achieving them, but it does not mandate any particular substantive end.

This Article proceeds in three parts. Part II details one way in which the phrase “an unpatentable abstract idea” can be disambiguated, identifying four distinct concepts that, first, the phrase can reasonably be interpreted to invoke as a linguistic matter and that, second, the phrase has actually been employed to invoke in Supreme Court and Federal Circuit precedent prior to the Supreme Court’s opinion in *Bilski*. Part III enumerates some of the benefits of identifying the distinct types of unpatentable abstract ideas as a strategy for moving forward in a post-*Bilski* world. As a coda, Part IV briefly considers how the concepts developed in Part II can shed light on the Supreme Court’s majority opinion in *Bilski*. It raises an array of possible answers to the question that the Supreme Court did not address: Why are the claims at issue in *Bilski* claims to unpatentable abstract ideas?

II. IDENTIFYING THE MULTIPLE MEANINGS OF THE PHRASE “AN UNPATENTABLE ABSTRACT IDEA”

What constitutes an unpatentable abstract idea? Based on Supreme Court and Federal Circuit precedent prior to the Supreme Court’s opinion in *Bilski*, the answer is that it depends. More specifically, it depends on the answers to three nested questions that identify three nested ambiguities in the words that make up the phrase. First, what constitutes a claim to an “idea”? Is it a claim that describes an idea in someone’s head—i.e., a mental process—or a claim that describes a set of extra-mental embodiments of an inventor’s mental idea about how to improve technology? Second, assuming that the claim describes extra-mental embodiments, what is the entity that is too abstract? Is it the language that defines the boundaries of the claim or the individual embodiments of an invention described by the claim language? Third, assuming that it is the individual claimed embodiments that are too abstract, what does “abstract” mean? In other words, in what way are the embodiments too “abstract”? Are they abstract in the sense of intangible or abstract in the sense of not applied? As illustrated in Figure 1 and discussed at length in the remainder of this Part, these three nested questions suggest that there are four distinct concepts that are all harbored under the umbrella term of “an unpatentable abstract idea.”

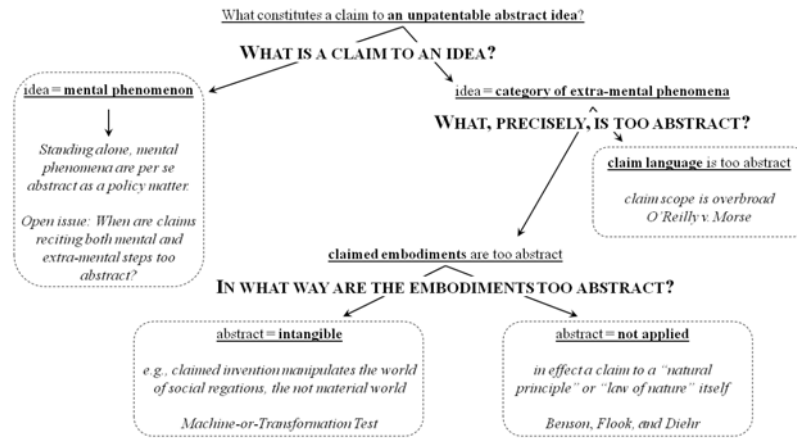


Figure 1

To avoid confusion, it may prove helpful for the reader to keep in mind that the project of clarifying the four distinct meanings of the phrase “an unpatentable abstract idea” that is pursued throughout this Part is not intended to mount a normative defense of any particular curtailment of patent eligible subject matter. This Part defers questions about whether any particular type of abstract idea that the courts have in the past held or intimated to be unpatentable under section 101 should in fact be so. The goal here is only to identify with greater precision four distinct contested areas. The working assumption is that, if this task is accomplished, we will be in a better position to have informed normative debates about what should and should not be patentable and about the conditions under which the section 101 doctrine of patent eligibility is or is not needed to curtail patentability.

A. *What is a Claim to an Idea?*

Before addressing the question of what constitutes a claim to an abstract idea, it is useful to think about what constitutes a claim to an idea. There are two distinct answers to this question, and each leads to a different understanding of the limits on patent eligibility created by a prohibition on the patenting of abstract ideas.

1. *Idea = Mental Phenomenon*

On the one hand, an idea is a mental phenomenon or a human thought,²³ so claims to ideas can be interpreted in a literal, direct sense to mean claims to mental states or processes. Just like the language used in a *claim to a drug* describes a drug by referencing its chemical formula or some other property, the language used in a *claim to an idea* can describe a thought in the human mind by referencing some of its functional properties.²⁴ Interpreted in this literal fashion, claims to ideas, if valid, grant their owners rights to exclude others from using their minds to think the thoughts described by the claim.

In *Gottschalk v. Benson*,²⁵ the Supreme Court listed “mental processes” and “abstract intellectual concepts” as distinct categories of subject matter that are not eligible for patent protection.²⁶ Assuming that the label “abstract intellectual concepts” is interchangeable with the label “abstract ideas,” *Benson* suggests that the prohibition on claims to mental processes should not be subsumed within the prohibition on claims to abstract ideas.²⁷ However, the Federal Circuit deviated from this interpretation of *Benson* and used the rhetoric of abstract ideas to deal with claims to mental processes in its revised opinion in *In re Comiskey*.²⁸ In the course of discussing what constitutes an unpatentable abstract idea, the Federal Circuit elaborated on its interpretation of the rules that govern the patentability of mental processes.²⁹ The court never paused to consider the notion that a claim to a human mental process was not a type of claim to an abstract idea, regardless of the specificity of the claimed act of thinking.³⁰

²³ THE AMERICAN HERITAGE COLLEGE DICTIONARY 673 (4th ed. 2002) (defining an idea as “[s]omething, such as a thought, that potentially or actually exists in the mind because of mental activity”).

²⁴ The day in which thoughts can be described with any reasonable degree of precision by the structural properties of brain states remains in the future, although perhaps not the distant future.

²⁵ 409 U.S. 63 (1972).

²⁶ *Id.* at 67.

²⁷ *Id.*

²⁸ *In re Comiskey*, 554 F.3d 967, 978–80 (Fed. Cir. 2009).

²⁹ *Id.*

³⁰ The danger of the Federal Circuit’s choice to lump claims to mental processes in with other claims to abstract ideas is that the single label creates a presumption that the same set of doctrinal restraints must govern patent eligibility in both contexts. *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc) (arguing that the nuances of the doctrine of patent eligibility are identical regardless of whether a claim to a mental process or a claim to any other type of abstract idea is involved), *aff’d on other grounds*, 130 S. Ct. 3218 (2010); *Prometheus Labs., Inc. v. Mayo Collaborative Servs.*, No. 2008-1403, 2010 WL 5176124 (Fed. Cir. Dec. 17, 2010) (same). Taking its lead from the emphasis on unpatentable abstract ideas in the Supreme Court’s majority opinion in *Bilski*, this Article goes against the grain of *Benson* and treats patent-ineligible mental-process claims as a subset of claims to unpatentable abstract ideas. However, it avoids the pitfall of the Federal Circuit’s approach in *Comiskey* and *Bilski* because it expressly argues that the distinct concepts

2. *Idea = Category of Extra-Mental Phenomena*

On the other hand, it is commonplace to think of run-of-the-mill patents as claiming ideas even if the claims at issue do not describe idea-like mental processes.³¹ The Supreme Court has liberally used the phrases “protection of [an] *idea*” and “a property right in an *idea*” to describe the heartland of patent protection.³² Similarly, to distinguish the protection available under copyright law from the protection routinely available under patent law, courts routinely say things like, “[i]n order to enjoy a lawful monopoly over the *idea* or functional principle underlying a work, the creator of the work must satisfy the more stringent standards imposed by the patent laws.”³³ The intuition underlying this usage of phrases like “a claim to an idea” is that the set of extra-mental things described by a claim in some way embodies an idea or concept thought up by the inventor. For example, it is conventional to say that the inventor of a new mousetrap can obtain patent protection for his *idea* of how to build a better mousetrap even when the claims that the inventor obtains describe extra-mental devices that are capable of catching mice. What is meant here by a “claim to an idea” is clearly not that the mousetrap inventor can obtain rights to exclude others from performing idea-like mental processes. The mousetrap inventor does not obtain “claims to ideas” in the literal sense of the phrase. Rather, it means that the inventor can obtain rights to exclude others from making, using, selling, offering to sell, or importing a category of extra-mental embodiments of an invention which consists roughly of the set of things or methods that embody the knowledge (i.e., the human thoughts) conveyed by a patent specification, or perhaps that are made possible by that knowledge. In conventional patent-speak, this is a claim to an idea, too, but only in an indirect way. The embodiments of the invention—e.g., the individual mousetraps that infringe a mousetrap claim—are extra-mental entities that embody the inventor’s idea in some fashion. Here, the idea at issue is not the thing described by the claim. Rather, it is the entity upon which patent law relies to define the outer boundaries of the scope of a claim that describes a set of extra-mental entities. In this indirect sense of a

identified through disambiguation may call for distinct patent-eligibility rules. *See infra* text accompanying notes 110–14. It would be reasonable to argue, however, that different semantic labels would help to clarify the issue. *See supra* note 21.

³¹ *See, e.g.,* Tun-Jen Chiang, *The Levels of Abstraction Problem in Patent Law*, 105 Nw. U. L. REV. (forthcoming June 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1434465 [hereinafter Chiang, *Abstraction Problem*] (“The invention that defines monopoly scope [in patent law] is an idea.”); Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law’s Presumption of Validity*, 60 STAN. L. REV. 45, 48 (2007) (describing the “normal circumstances” of patent protection in which the patent “protects the inventor from having his idea stolen” and the patent is “worth nothing unless and until the associated inventor can find customers for his idea”).

³² *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 149 (1989) (emphases added).

³³ *Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1526 (9th Cir. 1992) (emphasis added).

“claims to ideas” in which the claims describe extra-mental embodiments, all patent claims are claims to ideas.³⁴

B. What, Precisely, Is Too Abstract?

What does it mean for a claim to an idea to be impermissibly abstract? The answer to this question depends on the discussion in the previous section concerning what one means by a “claim to an idea”.

1. Idea = Mental Phenomenon

When claims to ideas are claims that describe the processes and mental states in human minds, the modifier “abstract” in the notion of an unpatentable abstract idea may at first seem superfluous or redundant. When the abstract is equated with the intangible,³⁵ all mental processes seem inherently abstract. This is not, however, because mental processes do not have a basis in the physical world as a factual or scientific matter. The prevailing materialist positions in philosophy of mind strongly suggest that mental states are in some way correlated with physical brain states.³⁶ Rather, mental processes are viewed as abstract for policy reasons—we simply do not want patent rights to extend too far into the workings of the human mind, so we label thought as abstract in the sense of intangible. In other words, human thought is per se abstract as a matter of legal construction, not inherently abstract as a factual matter exogenous to patent policy. Given this constructive abstractness of human thought, it is unsurprising that courts have refused to recognize such a thing as a claim to a patentable non-abstract idea when a claim to an idea describes human thought in isolation. The Supreme Court has long acknowledged that mental processes are not patent eligible,³⁷ and the Federal Circuit has interpreted this statement to mean that any claim describing a purely mental process is a claim to an unpatentable abstract idea, regardless of the nature of the claimed mental processes.³⁸

However, the modifier “abstract” need not be irrelevant in all claims describing newly invented mental processes. Although claims to mental processes in isolation are per se abstract for policy reasons, claims that describe a mental process as a single step in a multi-step method need not be. Perhaps the claim limitations that describe extra-mental processes can make the claim as a whole patentable (and thus not abstract), even if

³⁴ In *Gottschalk v. Benson*, the Supreme Court stated that “one may not patent an idea,” 409 U.S. 63, 71 (1972), but construing this statement in its indirect sense and taking it at face value would invalidate all patent claims.

³⁵ See *infra* Part II.D.1.

³⁶ JAEGWON KIM, PHILOSOPHY OF MIND 50–52 (2d. ed. 2006) (“[T]he fact is that substance dualism has played a very small role in contemporary discussions in philosophy of mind.”).

³⁷ *Benson*, 409 U.S. at 67.

³⁸ *In re Comiskey*, 554 F.3d 967, 978–80 (Fed. Cir. 2009); *Prometheus Labs., Inc. v. Mayo Collaborative Servs.*, No. 2008-1403, 2010 WL 5176124, at *10 (Fed. Cir. Dec. 17, 2010).

the advance over the prior art resides entirely in a mental process. This is precisely the route that the Federal Circuit took in *Prometheus Laboratories, Inc. v. Mayo Collaborative Services*.³⁹ It examined a claim that recites a newly invented mental process in combination with prior-art extra-mental steps to determine whether the presence of the extra-mental steps as claim limitations meant that, as a whole, the claim constituted patent eligible subject matter.⁴⁰

As a policy matter, the wisdom of this tangibility-oriented approach for assessing the patent eligibility of mental-process claims is beyond the scope of this Article to address.⁴¹ However, what is clear is that claims reciting both newly invented mental processes and extra-mental steps constitute one type of claim to an idea that can be impermissibly abstract, and thus patent ineligible, and that need to be kept distinct from other types of unpatentable claims to abstract ideas.

2. *Idea = Category of Extra-Mental Phenomena*

Moving from the direct sense of “claims to ideas” to its indirect sense, what makes a claim to a category of extra-mental embodiments of an idea more or less abstract? The answer, again, is that it depends. There is an ambiguity in the nature of the entity that can become too abstract. Claim language can be too abstract, or, in the alternative, the real-world things that constitute the embodiments of an invention and that are described by the claim language can be too abstract.⁴² Abstraction in these distinct entities leads to different concepts of an unpatentable abstract idea. Part II.C addresses abstraction in claim language, and Part II.D turns to abstraction in the embodiments described by the claim language.

³⁹ 2010 WL 5176124, at *7–11.

⁴⁰ *Id.* (querying whether extra-mental steps transform an article into a different state or thing and whether they are central to the claimed method).

⁴¹ If any claims at all in which the invention resides solely in a mental process are to be issued, it is perhaps the distinction between treatment protocols (performed predominantly by end users) and research protocols (performed predominantly by basic scientists) that should be the touchstone of patent eligibility. See Kevin Emerson Collins, *The (Ir)relevance of Intangibility in Medical Diagnostic Patents*, U. ILL. L. REV. (forthcoming 2011) (draft on file with the Lewis & Clark Law Review).

⁴² The failure to recognize the distinction between abstraction in claim language and the abstraction in claimed embodiments is indicative of a broader failure in patent discourse to recognize the dual nature of claims as both words and sets of things or methods described by words. See Kevin Emerson Collins, *The Reach of Literal Claim Scope into After-Arising Technology: On Thing Construction and the Meaning of Meaning*, 41 CONN. L. REV. 493, 502–03 (2008) (distinguishing the “meaning-scope” and the “thing-scope” of a patent claim).

C. Claim Language Is Too Abstract

Abstraction in the language of a patent claim is simply generality in the claim language.⁴³ Here, claims become more abstract by describing an invention with more and more generality, and thus less and less detail, and encompassing a larger and larger set of distinct embodiments.⁴⁴ For an example of an unpatentable abstract idea that results from the use of claim language at too high a level of abstraction, consider the patent law casebook chestnut *O'Reilly v. Morse*.⁴⁵ After making the first operative telegraph, Morse sought to claim in his famous eighth claim “the use of . . . electro-magnetism . . . for marking or printing intelligible characters, signs, or letters, at any distances” without limiting himself “to the specific machinery . . . described in the foregoing specification and claims.”⁴⁶ The Supreme Court invalidated the claim as “too broad” because the language of the claim was too abstract. It described too large a set of embodiments that, in turn, encompassed too many yet-to-be invented machines.⁴⁷

The problem of too much abstraction in claim language in *O'Reilly* is nearly an exact parallel to the problem of too much abstraction in the

⁴³ The problem of abstraction in claim language is distinct from the problem of the unintelligibility of claim language. The latter is conventionally addressed under the doctrine of indefiniteness. 35 U.S.C. § 112, ¶ 2 (2010).

⁴⁴ In mathematics, the definition of abstraction is “the process of formulating a generalized concept of a common property by disregarding the differences between a number of particular instances.” E. J. BOROWSKI & J. M. BORWEIN, THE HARPER COLLINS DICTIONARY OF MATHEMATICS 4 (Eugene Ehrlich ed., 1991). A parallel definition is at work when the term “abstract” modifies the claim language rather than the claimed embodiments. The more differences between things one disregards or omits, the more general the language and the greater the abstraction. Cf. CRUSE, *supra* note 18, at 50 (portraying greater generality in the meaning of words as “a more extensive area of quality space”).

⁴⁵ 56 U.S. 62 (1853). See also *Le Roy v. Tatham*, 55 U.S. 156 (1853); *Wyeth v. Stone*, 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18, 107); *Whittemore v. Cutter*, 29 F. Cas. 1123, 1124 (C.C.D. Mass. 1813) (No. 17, 601). Although they are not conventionally cited as cases involving either unpatentable abstract ideas in particular or limits on patent eligibility in general, the Supreme Court cases from the first half of the twentieth century prohibiting the use of functional language to describe an invention at its point of novelty are near-perfect parallels to *O'Reilly*. See, e.g., *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1 (1946); *Gen. Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364 (1938); *Holland Furniture Co. v. Perkins Glue Co.*, 277 U.S. 245 (1928).

⁴⁶ *O'Reilly*, 56 U.S. at 112.

⁴⁷ *Id.* at 113. *O'Reilly* does not use the phrase “an unpatentable abstract idea” to describe Morse’s eighth claim. To the extent that the Court labels the problem with Morse’s eighth claim at all, it is referred to as an impermissible claim to a principle. *Id.* at 114–18 (discussing why Neilson’s patent on an improvement to blast-air furnaces was not an impermissible claim to a “principle”). However, twentieth century Supreme Court cases addressing patent eligibility often use the terms “idea” and “principle” interchangeably. See, e.g., *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

scope of an author’s rights under copyright law.⁴⁸ In his famous levels of abstraction formulation of the idea/expression dichotomy in *Nichols v. Universal Pictures Corp.*, Judge Learned Hand noted that:

[u]pon any work . . . a great number of patterns of increasing generality will fit equally well, as more and more of the incident is left out. . . . [T]here is a point in this series of abstractions where they are no longer protected, since otherwise the playwright could prevent the use of his “ideas,” to which, apart from their expression, his property is never extended.⁴⁹

Because the copying of ideas is permissible, a copyright owner cannot define the boundary of the set of infringing works at the highest levels of generality. The prohibition on claims to abstract ideas articulated in *O’Reilly* places the same constraint on patent rights: Extremely general language cannot be used to establish the scope of a patentee’s rights to exclude.⁵⁰ Impermissible abstraction/generality in claim language is a vague concept, and, as it is accepted to be in copyright, it is perhaps inevitably so. Thus, how abstract is too abstract remains a question that is difficult to answer with precision,⁵¹ especially as nearly all claims are broader than the set of embodiments actually disclosed to the person having ordinary skill in the art under the disclosure doctrines.⁵²

Critically—and this point is often overlooked—abstraction in the language used to delineate the scope of a claim can be independent of abstraction in the individual embodiments of an invention that are described by the claim language.⁵³ In other words, claim language can be abstract even if each and every one of the things or methods described by the claim is entirely concrete and thus not abstract at all. For example, consider *O’Reilly* again. Every conceivable infringing embodiment of

⁴⁸ For further analyses of the parallel, see Chiang, *Rules and Standards*, *supra* note 20; Peter Yun-hyoung Lee, *Inverting the Logic of Scientific Discovery: Applying Common Law Patentable Subject Matter Doctrine to Constrain Patents on Biotechnology Research Tools*, 19 HARV. J.L. & TECH. 79, 98–100 (2005); John Shepard Wiley, Jr., *Copyright at the School of Patent*, 58 CHI. L. REV. 119, 158 (1991).

⁴⁹ *Nichols v. Universal Pictures Corp.*, 45 F.2d 119, 121 (2d Cir. 1930).

⁵⁰ Justice Breyer has cited *Nichols* to explain the prohibition on claims to abstract intellectual concepts in patent law. *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 134 (2006) (Breyer, J., dissenting from the dismissal of the writ of certiorari as improvidently granted).

⁵¹ A classic way of highlighting the vagueness of excessive abstraction in claim language is to contrast *O’Reilly* with *The Telephone Cases*, another nineteenth century Supreme Court patent opinion in which the Court held that a claim by Alexander Graham Bell that employed quite general language was not impermissibly abstract. 126 U.S. 1, 534 (1887).

⁵² *Cf.* Kevin Emerson Collins, *Enabling After-Arising Technology*, 34 J. CORP. L. 1083 (2009) (discussing three ways in which claims can be enabled and yet still encompass after-arising technology).

⁵³ The two ways in which individual embodiments of an invention can be too abstract—either by being insufficiently tangible or by implicating insufficiently applied “laws of nature”—are explored in the following section. *See infra* Part II.D.

Morse's eighth claim is a method of using a concrete, tangible machine that serves the useful, applied purpose of communicating at a distance. The claim language may not specify which machinery in particular is needed, but some machinery is presumptively needed in every embodiment. Therefore, each of the embodiments within Morse's eighth claim is patent eligible in the sense that it could be validly patented by someone at some time, but Morse's eighth claim is nonetheless a claim to an unpatentable abstract idea because Morse could not claim them all at once with abstract/general claim language.⁵⁴ The *only* problem when a claim describes an unpatentable abstract idea in the *O'Reilly* sense is that the claim language is too abstract/general in that it sweepingly describes too many distinct embodiments all at once, too many of which the person seeking the patent claim did not actually invent.⁵⁵

This discussion of the problem with Morse's eighth claim in *O'Reilly* provides a conceptual litmus test for determining if the abstractness of a claim is solely an artifact only of the generality of the claim language or, as explored in the following section, if the abstractness is in part an artifact of the individual embodiments described by the claim language. The litmus test invokes an idealization that is common in patent law—the “picture claim.” A picture claim is an impossibly precise claim that describes an invention in such detail that the claim encompasses only a single thing-type rather than a set of thing-types.⁵⁶ (The title provocatively suggests that all of the detail included in a visual photograph of a thing is included in the claim limitations.) Initially, the litmus test requires a judge or examiner to identify all of the conceivable embodiments of a claim—all of the instances of things or methods that could infringe the claim at any point in time before the patent expires.⁵⁷ If it is possible for

⁵⁴ Similarly, the Court in *O'Reilly* noted that Fulton could not have claimed all methods of “us[ing] the motive power of steam . . . for the purpose of propelling vessels,” as such a claim would be an unpatentable abstract idea. *O'Reilly v. Morse*, 56 U.S. 62, 113 (1853). Yet, every embodiment of this hypothetical claim by Fulton would incorporate a steam engine (a concrete, tangible thing) and serve a useful, applied purpose (propelling a vessel).

⁵⁵ The problem addressed by the idea/expression dichotomy in copyright is an exact parallel. *Cf. supra* text accompanying notes 48–50. The defendant's allegedly infringing work in *Nichols* was not itself intrinsically abstract in any way—it was a fully formed and executed play. What *Nichols* prohibits is the use of an abstract idea to define the scope of an author's rights in a manner that sweepingly encompasses many works that are comprised of expression not produced by the author of the copyrighted work.

⁵⁶ *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991) (defining a picture claim). *Cf. Jeffrey A. Lefstin, The Formal Structure of Patent Law and the Limits of Enablement*, 23 BERKELEY TECH. L.J. 1141, 1170–74 (2008) (noting that the concept of a “species” claim is an idealization and that all claims are in fact “genus” claims).

⁵⁷ The exercise of listing all of the members of the set of distinct, infringing things is a theoretical exercise only, of course, because almost all claims describe infinitely large sets of embodiments. *See Lefstin, supra* note 56, at 1170–74. Furthermore, the exercise requires an impossibly prescient thinker—one who can

each and every real-world embodiment to be patented by someone at some time (and in light of some prior art) with a picture claim, then any abstractness problem that exists necessarily resides solely in the abstractness of the language used to define claim scope and not in the abstractness of the individual embodiments.⁵⁸ Each embodiment could be patented by someone at some time, so the problem is only that the inventor seeking the abstractly drawn claim cannot patent them all at the time that he sought to patent them with general claim language. This was the situation that the Court confronted when examining Morse’s infamous eighth claim. As explored in the following section, however, there are situations in which particular embodiments of an invention are so abstract that they could not be patented by anyone at any time (and in light of any prior art), even if the embodiments were to be described with picture claims. In this latter scenario, the abstractness problem necessarily lies at least in part in the excessive abstractness of the individual embodiments of an invention and not solely in the abstractness of claim language.

D. Claimed Embodiments Are Too Abstract

Assuming that it is an embodiment described by the claim language—and not simply the language used to define the claim—that is too abstract, what makes an embodiment of an invention impermissibly abstract? Yet again, the answer is that it depends. There are two distinct definitions of the word “abstract,” and each leads to a different understanding of why the embodiments described by a patent claim may be impermissibly abstract.⁵⁹ Furthermore, each understanding maps onto

foresee all future technological developments that will occur before the expiration of a patent claim.

⁵⁸ The litmus test is only useful to determine whether an abstractness problem, assuming it exists, is a problem of abstract claim language or abstract claimed embodiments. It is not useful for addressing the vagueness question involving whether or not claim language is impermissibly abstract.

⁵⁹ A third meaning of an embodiment that is abstract might invoke an invention that is too nascent, too inchoate, insufficiently thought through, or just not yet sufficiently baked *as it is disclosed in the patent specification*. This definition of a claim to an abstract idea focuses on the embodiments as disclosed in the specification. It is therefore of a different kind from the two definitions of claims to impermissibly abstract embodiments addressed in this Article, both of which focus on abstraction in allegedly infringing, real-world technologies. Intuitively, if I disclose the rough outlines of a process, but I’m not yet sure exactly what it is or how to make it work, my invention is abstract in the sense that I have not yet actually or constructively reduced it to practice. It seems to be this type of claim to an impermissibly abstract idea—i.e., an idea that is only abstractly disclosed in the patent specification at the time of filing—that animates Professor John Duffy’s suggestion that the prohibition on claims to abstract ideas under section 101 is either a penumbra around, or redundant in light of, the prohibition on unenabled and indefinite claims under section 112. John F. Duffy, *Rules and Standards on the Forefront of Patentability*, 51 WM. & MARY L. REV. 609, 645 (2009) (arguing that, if a claimed idea is abstract, then the disclosed embodiments cannot constitute an enabling specification and claim scope cannot be

cases in which courts have held claims to abstract ideas to be patent ineligible subject matter under section 101.

1. *Abstract = Intangible*

On the one hand, abstract means intangible, and being abstract means being divorced from the world of material things.⁶⁰ It is a prohibition on claims to abstract ideas in this sense of abstract that seems to be the primary motivation of the Federal Circuit's machine-or-transformation test, at least as the Federal Circuit applied the test in its en banc *In re Bilski* opinion.⁶¹ Formally, the machine-or-transformation test states that a method claim is eligible for patent protection only if the recited method is either (a) tied to a particular machine or (b) responsible for transforming a particular article to a different state or thing.⁶² Informally, it limits patent eligibility to inventions whose embodiments are manifest in the world of material things that we can touch, see, or at least detect with technology that enhances our senses.⁶³

identified with a reasonable degree of precision). Similarly, Professor Ten-Jun Chiang's proposed taxonomy of distinct types of unpatentable abstract ideas hinges on the nature of the disclosed embodiments and ignores the nature of the infringing embodiments made, used, and sold by potential patent infringers. *See generally* Chiang, *Abstraction Problem*, *supra* note 31. For judicial rhetoric equating a disclosure that fails the enablement requirement with a disclosure that communicates only a nascent or insufficiently developed "idea," see *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997) ("Patent protection is granted in return for an enabling disclosure of an invention, not for vague intimations of general ideas that may or may not be workable Tossing out the mere germ of an idea does not constitute enabling disclosure."). *See also In re '318 Patent Infringement Litig.*, 583 F.3d 1317, 1323–24 (Fed. Cir. 2009) (citing *Genentech, Inc. v. Novo Nordisk, A/S* for the proposition that the enablement and utility doctrines "prevent[] mere ideas from being patented").

⁶⁰ THE AMERICAN HERITAGE COLLEGE DICTIONARY 6 (4th ed. 2002) (defining abstract as "[c]onsidered apart from concrete existence").

⁶¹ *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc), *aff'd on other grounds*, 130 S. Ct. 3218 (2010). *Cf.* Miller, *supra* note 8, at 5 ("For the Federal Circuit majority, then, the machine-or-transformation test was a critical step in operationalizing the Supreme Court's longstanding injunction against permitting the patenting of abstract ideas.").

⁶² *In re Bilski*, 545 F.3d at 954.

⁶³ Technically, the machine-or-transformation test is a hybrid test that attempts to deal with the problems of abstractness (insufficient tangibility) of embodiments and abstraction (insufficient specificity) in claim language at the same time. The emphasis on the need for a "particular" machine and a transformation of a "particular" article allows the machine-or-transformation test to address *O'Reilly*-type problems with excessive generality in language. *See supra* Part II.C (discussing *O'Reilly*-type problems of excessive abstraction in claim language). *O'Reilly* problems occur when the machine/article recited as a limitation is sufficiently tangible, but not sufficiently particular. *In re Bilski*, 545 F.3d at 957 ("[A] claim that is tied to a particular machine or brings about a particular transformation of a particular article does not pre-empt all uses of a fundamental principle in any field . . . [and therefore] is not drawn to [a] principle in the abstract.").

The Federal Circuit’s opinion in *In re Bilski* demonstrates that the machine-or-transformation test focuses on the problem of claims to abstract ideas in the sense of claims that encompass embodiments that are insufficiently tangible. In the eyes of the Federal Circuit, the principal problem with the *In re Bilski* claims—and other patent ineligible “so-called business methods”—was that the claimed methods could be performed without using sufficiently physical, machine-like technology and without causing sufficient change to the material world.⁶⁴ Under the machine prong of the test, the patent applicant conceded that no tangible machine was required to perform the method.⁶⁵ The Federal Circuit concluded that the claims did not satisfy the transformation prong of the test, either, because “public or private legal obligations . . . or other abstractions . . . are not physical objects or substances, and they are not representative of physical objects or substances.”⁶⁶ Here, “abstractions” are entities that are insufficiently tangible, i.e., that are not physical objects. As with most types of abstract ideas, claims to insufficiently tangible embodiments raise vagueness problems: Precisely how tied to the physical world does a method need to be to avoid being impermissibly abstract?

Critically, the problem on which the Federal Circuit focused in its *In re Bilski* opinion is not the *O’Reilly* problem in which the abstractness resides solely in excessively general claim language. To drive this point home, consider the conceptual litmus test developed above at the end of Part II.C.⁶⁷ Imagine a hypothetical variant of the *Bilski* claim in which a picture claim of a hedging transaction (a “motion-picture claim” because the claim is a method?) without machine assistance is scripted down to its smallest detail. This picture claim specifies the precise terms of the transactions, the exact criteria that one uses to identify “market participants” with “counter-risk positions,” the minutia of what the parties to the transactions say to each other, and even perhaps the choreography of how the parties move when they are together in a room.⁶⁸ The amount

⁶⁴ *Id.* at 962 (“And some so-called business methods, such as that claimed in the present case, involve the manipulation of even more abstract constructs such as legal obligations, organizational relationships, and business risks.”).

⁶⁵ *Id.*

⁶⁶ *Id.* at 963. The transformation of physical objects should clearly satisfy the transformation prong of the machine-or-transformation test. However, the implication in the Federal Circuit’s *In re Bilski* opinion that the computer-aided manipulation of data that represent physical objects satisfies the transformation prong merits more careful scrutiny. See Kevin Emerson Collins, *In re Bilski: Tangibility Gone “Meta”*, PATENTLY-O (Nov. 1, 2008), <http://www.patentlyo.com/patent/2008/11/professor-collins.html>. The issue of the computer-manipulation of meaningful data was not directly before the court in *In re Bilski* as the claims were not limited to methods of hedging using a programmed computer.

⁶⁷ See *supra* text accompanying notes 56–57.

⁶⁸ Such a motion-picture claim is, of course, of little economic value to a patentee, but it is nonetheless a useful conceptual tool to reveal the distinct reasons why claims describe unpatentable abstract ideas.

of specificity, and the corresponding absence of generality, in the language of the hypothetical picture claim mean that there is no *O'Reilly* problem of excessively general claim language. Yet, this hypothetical picture claim would likely remain a patent ineligible invention for the Federal Circuit under the machine-or-transformation test. If this were the outcome, the problem leading to patent ineligibility would be the abstractness/intangibility of a claimed embodiment, not solely the abstractness/generality of the claim language that describes the embodiments.⁶⁹

2. *Abstract = Not Applied*

On the other hand, abstract is also defined as “[n]ot applied or practical,”⁷⁰ and being abstract means being too theoretical.⁷¹ It is a prohibition on claims to abstract embodiments in this sense of the word “abstract” that lies at the core of the Supreme Court’s famous trilogy on the patent eligibility of computer software: *Gottschalk v. Benson*,⁷² *Parker v. Flook*,⁷³ and *Diamond v. Diehr*.⁷⁴ In these cases, the Court established that inventions based on natural principles, fundamental truths, and laws of nature are patent ineligible if they employ the principle, truth, or law in the abstract, i.e., in a manner that does not go far enough in applying the principle, truth, or law to achieve specified practical ends.⁷⁵

On its face, this prohibition on claiming unapplied natural principles and the like might seem simply to mean that Einstein cannot claim $E=mc^2$ itself and Newton cannot claim the universal law of

⁶⁹ Importantly, both *O'Reilly* problems of excessively general claim scope and machine-or-transformation test problems of claims that describe excessively intangible embodiments can be remedied through the addition of further claim limitations. Adding limitations restricting Morse’s eighth claim to the machinery that Morse actually invented would make the claim patent eligible; adding claim limitations restricting the *Bilski* claims to the use of a novel and nonobvious machine (whether electronic or analog) that created a forum in which market participants could post information about the risks they wish to hedge would also (arguably, at least) make the claim patent eligible under the machine-or-transformation test. Therefore, the ability to remedy an abstract-idea problem through the reduction in claim scope is not dispositive of the type of unpatentable abstract idea at issue. Stated inversely, all claims to unpatentable abstract ideas that can be rendered patent eligible through a reduction in claim scope are not *O'Reilly* problems in which the sole problem is excessively general claim language. The reduction in claim scope achieves two very different goals in the two different situations. In the *O'Reilly* context, the limitations restrict the scope of the claim to what was actually invented. When claims to insufficiently tangible embodiments are at issue, the limitations restrict the scope of the claim to the use of material technology.

⁷⁰ THE AMERICAN HERITAGE COLLEGE DICTIONARY 6 (4th ed. 2002).

⁷¹ A related, yet distinct, notion is impermissible abstraction in the disclosed embodiments in the sense that the disclosed embodiments are not practical because they are nascent and ill-formed at the time of filing. See *supra* note 59.

⁷² 409 U.S. 63 (1972).

⁷³ 437 U.S. 584 (1978).

⁷⁴ 450 U.S. 175 (1981).

⁷⁵ *Id.* at 191–93; *Flook*, 437 U.S. at 594.

gravitation itself.⁷⁶ However, the doctrine of patent eligibility would not be needed to keep such direct claims to newly discovered principles, truths, or laws out of the patent regime. They are patent gibberish. Patent claims describing “the state of affairs in which $E=mc^2$ ” are malformed in that they don’t describe a set of things or processes at all. Even to the extent that they are properly formed, such claims would be inherently anticipated under section 102, as the states of affairs described by the claims long predated their discovery by humankind.⁷⁷ If the prohibition is to have any substantive bite at all—and it must, as it is responsible for invalidating the well-formed, novel claims at issue in *Benson* and *Flook*—it must mean something more.

What the prohibition developed and refined in *Benson*, *Flook*, and *Diehr* means is perhaps most readily ascertained by positioning the claimed embodiments in *Benson* as the archetypal, core examples of embodiments that are too abstract to be eligible for patent protection. *Benson* involved a claim to a method of executing a newly discovered mathematical algorithm on a computer in order to translate numbers from one system of representation into another.⁷⁸ The Court first held that mathematical algorithms were laws of nature⁷⁹ and then held that the claim to a method of performing the mathematical operations that constitute the algorithm on a computer was in practical effect a claim to the law of nature itself and thus patent ineligible.⁸⁰ Here, then, is a core of embodiments of an invention that are too abstract to be eligible for patent protection under *Benson*: methods of executing formal mathematical operations on computers and computers programmed to perform those mathematical operations.

Initially, it is important to recognize that *Benson*, like the Federal Circuit’s opinion in *Bilski*, does not simply raise an *O’Reilly* issue in which the problem of abstractness resides solely in excessively general claim

⁷⁶ *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980); *Flook*, 437 U.S. at 593 n.15.

⁷⁷ *Cf. In re Bilski*, 545 F.3d 943, 1013 (Fed. Cir. 2008) (en banc) (Rader, J., dissenting) (“Natural laws and phenomena can never qualify for patent protection because they cannot be invented at all.”), *aff’d on other grounds*, 130 S. Ct. 3218 (2010). Of course, patent applicants can overcome the inherent anticipation problem by drafting claims that describe acts of thinking about these principles. It is common for no prior-art actor to have ever thought about a principle prior to its discovery by humankind. *Cf. also supra* notes 16–28 and accompanying text.

⁷⁸ *See Gottschalk v. Benson*, 409 U.S. 63, 73–74 (1972). Claims to methods of executing software functionality on a computer and claims to computers programmed with the same software are treated interchangeably. *See, e.g., Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053 (Fed. Cir. 1992). Therefore, *Benson* can also be understood to establish the patent eligibility rules for an apparatus claim to a computer programmed with the specified algorithm.

⁷⁹ Technically, *Benson* referred to a mathematical algorithm as an “idea.” 409 U.S. at 71. However, later cases have referred to mathematical algorithms as abstract ideas and laws of nature without making a substantive distinction. *See In re Bilski*, 545 F.3d at 953 n.6 (noting that the terms are used interchangeably).

⁸⁰ *See Benson*, 409 U.S. at 70–72.

language. To see that *Benson* places a substantive restriction on the patenting of embodiments that are too abstract, consider again the litmus test for claims with *O'Reilly* problems developed above.⁸¹ Imagine a hypothetical picture-claim variant of the *Benson* claim. Assume counterfactually that the *Benson* claim is limited to a particular brand and model of a prior-art computer and that it encompasses only the use of specific software code disclosed in the specification to perform the algorithm. This hypothetical (motion-)picture claim describes the use of a newly invented, fully specified, single thing,⁸² so it cannot be overbroad in the *O'Reilly* sense that it describes too many distinct things not invented by the applicant. Yet, this hypothetical picture claim would likely be just as patent ineligible as the actual *Benson* claim.⁸³ It still describes a known computer programmed with a newly discovered mathematical algorithm. If this hypothetical picture claim describes patent-ineligible subject matter, then the problem at the crux of *Benson* must be, at least in part, excessive abstractness in a claimed embodiment.

Given that *Benson* raises a problem in which an embodiment is excessively abstract, the important inquiry is to identify in what way an embodiment described by the hypothetical picture-claim variant of *Benson* is too abstract. *Benson* establishes that computers programmed to perform mathematical operations are excessively abstract things in the sense of being insufficiently applied or practical embodiments of newly discovered principles, truths, or laws.⁸⁴ Ironically, the defining trait of this type of abstract embodiment from a policy perspective is not that it lacks statutory utility under section 101⁸⁵ but rather that it is *too* useful. As *Benson* famously states, “the ‘process’ claim is so abstract and sweeping as to cover both known and unknown uses of the [algorithm]. The end use may . . . vary from the operation of a train to verification of drivers’ licenses to researching the law books for precedents”⁸⁶ In other words, the claim described a set of methods that are fundamental building blocks of progress in that they are part of “the basic tools of

⁸¹ See *supra* text accompanying notes 56–57.

⁸² Alternatively, the hypothetical claim could describe the fully specified, single thing itself as a picture claim to an apparatus. See *supra* note 56.

⁸³ But see *Benson*, 409 U.S. at 68 (expressing concern that the claimed method may “be performed through any existing machinery or future-devised machinery or without any apparatus.”).

⁸⁴ The assumption that *Benson*, *Flook*, and *Diehr* address only difficulties of inventions implicating newly discovered natural phenomena is undermined by the fact that the Arrhenius equation at issue in *Diehr* was “well-known” in the art at the time of the invention of the claimed method. *Diamond v. Diehr*, 450 U.S. 175, 177–78 (1981).

⁸⁵ The *Benson* invention was not only useful under section 101 but arguably more useful than the prior art: It allegedly increased a computer’s processing speed by decreasing the number of operations needed to translate numbers from one system of representation into another.

⁸⁶ *Benson*, 409 U.S. at 68.

scientific and technological work.”⁸⁷ The problem in *Benson* is not a problem of an abstract claim that describes too many distinct things/methods not invented by the inventor, as Morse’s eighth claim in *O’Reilly* did, but rather a problem of a claim that describes things/methods that were actually invented but that are abstract because they have too many end-uses and are thus insufficiently applied to merit patent protection.⁸⁸ *Benson* therefore establishes an exception for claims describing laws of nature and the like in the abstract to the default rule of patent protection. Ordinary claims to ordinary chemical compounds (or any other machine, manufacture, or composition of matter) encompass all end uses of the compounds, regardless of the extent to which the compound is an input into future innovation and regardless of the extent to which future uses are unknown at the time the claim is filed.⁸⁹

While a claim to a computer programmed with a newly invented mathematical operation is a clear example of an invention based on a principle, truth, or law that is too abstract (i.e., an invention in which the principle, truth, or law is insufficiently applied) to be patent eligible under *Benson*, precisely what changes are necessary to transform the embodiment into a patentable application of an invention is far from clear.⁹⁰ With the benefit of hindsight, the Supreme Court has interpreted *Flook* to mean that merely adding claim limitations that specify “a particular technological environment” or an “insignificant postsolution activity” does not alleviate the problem of an excessively abstract (i.e., insufficiently applied) embodiment of a principle, truth, or law.⁹¹

⁸⁷ *Id.* at 67.

⁸⁸ Even though the problem in *Benson* is an embodiment that is too abstract, the problem can be remedied by adding claim limitations that restrict the claim to particular uses of the embodiment. See *supra* note 69 (explaining that the ability to remedy an abstract-idea problem through the addition of claim limitations does not make the problem an *O’Reilly* problem in which the only problem is excessively general claim language).

⁸⁹ See, e.g., *B.G. Corp. v. Walter Kidde & Co.*, 79 F.2d 20, 22 (2d Cir. 1935). The only limitation on the default rule is that at least one use for the object must be known at the time of filing. *Brenner v. Manson*, 383 U.S. 519 (1966). For an argument that *Benson* was incorrectly decided because it deviates from the default rule of protecting end uses of claimed things, see Donald S. Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959, 984–85 (1986).

⁹⁰ *Benson* uses language suggesting that preemption is the key concept: Claims preempting all substantial practical applications of a mathematical algorithm are too abstract. See *Benson*, 409 U.S. at 71–72. However, later cases back off of preemption as the metric for measuring abstraction or, more precisely, they back off of a lack of full preemption as a sufficient condition for a patentable application. *Diamond v. Diehr*, 450 U.S. 175, 192 n.14 (1981) (“We rejected in *Flook* the argument that because all possible uses of the mathematical formula were not pre-empted, the claim should be eligible for patent protection.”). In sum, to the extent that preemption remains a means of distinguishing the abstract from the applied, precisely how much preemption is impermissible remains an extremely vague concept.

⁹¹ *Diehr*, 450 U.S. at 191–92.

Anchoring the other end of the spectrum, the Court held in *Diehr* that incorporating the programmed computer into a process, like the curing of rubber, that “is performing a function which the patent laws were designed to protect” does yield an applied, and thus patent eligible, embodiment of a principle, truth, or law.⁹² Between the two data points provided by *Flook* and *Diehr*, however, there is a vast unknown and, hence, unresolved problem of vagueness.⁹³

Nonetheless, to reiterate, there is one point that is clear: The concept of an unpatentable abstract idea established in *Benson* and *Flook*, and then limited in *Diehr*, is distinct from the other three concepts of an unpatentable abstract idea addressed earlier in this Article. It may be tempting to understand the holding in *Benson* as a branch of the prohibition on patenting mental processes in isolation.⁹⁴ Human minds can perform mathematical algorithms, and the execution of mathematical functions on a computer is commonly understood to be like a mental process.⁹⁵ However, the Supreme Court treated neither *Benson* nor *Flook* as involving claims that could be infringed by the human mind performing a newly invented thought process.⁹⁶ It also may be tempting to describe *Benson* as simply another incarnation of the problem of excessive generality in claim language that was at issue in *O'Reilly*.⁹⁷ However, the hypothetical picture-claim variant of *Benson* discussed above demonstrates that the crux of the *Benson* holding is a problem of an embodiment that is too abstract (not applied), not solely a problem of excessive generality in claim language that describes too many distinct embodiments.⁹⁸ Finally, it is tempting to elide abstraction in the sense of insufficient application, which is at issue in *Benson*, with abstraction in the sense of intangibility, which is the motivation

⁹² *Id.* at 192.

⁹³ The slipperiness is due in part to the fact that *Benson*, *Flook*, and *Diehr* are notoriously difficult to reconcile. *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1057 n.4 (Fed. Cir. 1992) (noting that it is “generally agreed” that *Diehr* implicitly modified *Flook* and *Benson*).

⁹⁴ *Cf. supra* text accompanying notes 23–26 (noting that one type of claim to an abstract idea is a claim that describes a mental process).

⁹⁵ It is the facile analogy between computer-executed processes and human mental processes that led to the demise of the mental steps doctrine in dicta in a case addressing the patent eligibility of a computer program. *In re Musgrave*, 431 F.2d 882, 894–95 (C.C.P.A. 1970).

⁹⁶ *See* *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972) (“We have . . . made clear from the start that we deal with a program only for digital computers.”). *Cf. In re Bilski*, 545 F.3d 943, 955 n.9 (Fed. Cir. 2008) (en banc) (interpreting *Benson* as addressing only computer software and not human thought).

⁹⁷ *Cf. supra* text accompanying notes 43–58 (noting that one type of claim to an abstract idea is a claim that uses overly general language describes too large a set of extra-mental embodiments).

⁹⁸ *See supra* text accompanying notes 84–89.

underlying the machine-or-transformation test.⁹⁹ However, the computer programmed to execute a newly discovered mathematical algorithm described by the hypothetical picture claim is both a particular machine and a tangible machine.¹⁰⁰ If they mean anything at all, *Benson*, *Flook*, and *Diehr* give rise to a distinct concept of an unpatentable abstract idea—one in which the impermissible abstraction is lodged in a technology that is *too* useful because it embodies a principle, truth, or law that is insufficiently applied.

III. THE BENEFITS OF FOUR DISTINCT CONCEPTS

Recognizing that there are several distinct concepts harbored under the umbrella term “an unpatentable abstract idea” is clearly necessary for judges, litigants, examiners, and scholars to communicate about what does and should constitute an unpatentable abstract idea.¹⁰¹ In addition, disambiguation is a productive route forward after the Supreme Court’s opinion in *Bilski* as a strategic matter. For anyone interested in increasing clarity and crafting patent protection to serve normative goals, it would have immediate payoff in at least five ways.

First, identifying the distinct concepts of an unpatentable abstract idea facilitates discussions about the normative justifications of the doctrine of patent eligibility. There are distinct policy concerns that

⁹⁹ *Cf. supra* text accompanying notes 60–69 (noting that one type of claim to an abstract idea is a claim that describes embodiments that are too abstract in the sense of being insufficiently connected to the material world).

¹⁰⁰ *See supra* text accompanying notes 81–89. The hypothetical picture claim describes a “particular” machine because both the hardware and software are specified in full. The Federal Circuit has itself noted that “*Benson* presents a difficult case under its own [machine-or-transformation] test in that the claimed process operated on a machine, a digital computer, but was still held to be ineligible subject matter.” *In re Bilski*, 545 F.3d at 955. It is in theory possible to argue that the claim does not describe a “tangible” machine because the software is what is new, and the software is relatively intangible, but this line of argument would lead to the categorical ineligibility of software for patent protection.

¹⁰¹ However, while the project of disambiguation is clearly advantageous, the precise contents of the distinct concepts of unpatentable abstract ideas identified in Figure 1 and discussed in Part II should not be taken as written in stone. The relevant precedent is sparse, complex, and at times contradictory, so others may observe the precedent and identify a different constellation of concepts as a descriptive matter. Furthermore, anyone with a normative belief about what inventions should and should not be patent eligible may believe that the proposed map should be modified even if it accurately depicts the pre-*Bilski* precedent on unpatentable abstract ideas. For example, this Author has argued that the meanings attributed to things by the human mind—including the meanings of the data manipulated by programmed computers—should play a more prominent role in curtailing patent eligibility. *See generally* Kevin Emerson Collins, *Semiotics 101: Taking the Printed Matter Doctrine Seriously*, 85 IND. L.J. 1379 (2010) [hereinafter Collins, *Semiotics*] (reframing the printed matter doctrine as a doctrine that prevents the patenting of meanings in human minds). For these reasons, Figure 1 is offered as a concept demonstrating that disambiguation is possible and as a point of departure for further debate.

justify the restrictions on the patent eligibility of the distinct concepts of an unpatentable abstract idea. *Benson* identifies claims to computers programmed with unapplied mathematical operations as basic-tool claims; the claimed embodiments are too useful to be treated as property because they are common inputs into a vast, diverse, and as-of-yet-unspecified array of future innovations.¹⁰² Claims written in excessively general language raise concerns about both over-rewarding inventors and sanctioning property in fundamental building blocks—not because any specific embodiment is fundamental, as it is in *Benson*, but because the scope of a claim defined by the functional goal that a technology achieves is likely to be too broad for competitors to effectively design around it.¹⁰³ Claims describing insufficiently tangible embodiments such as methods of doing business raise concerns related to, *inter alia*, the high costs of delineating patent interests and providing patents on methods that would likely have developed even absent patent incentives.¹⁰⁴ Claims reciting newly invented mental processes raise concerns about property in basic tools and restrictions on First Amendment rights,¹⁰⁵ and they uniquely implicate difficulties associated with nonvolitional infringement.¹⁰⁶ In addition, claims in which the advance over the prior art resides in an act of mental reasoning raise structural concerns that are not raised by other types of claims to abstract ideas: How can the knowledge disclosed in a patent specification be put in the “general store of knowledge”¹⁰⁷ and be free for all comers to use qua knowledge if the human, mental act of thinking about the disclosed knowledge can constitute infringement?¹⁰⁸ If one fails to distinguish the distinct concepts of an unpatentable abstract idea, then the normative justifications of the doctrine of patent eligibility look like a mish-mash of concerns, each

¹⁰² See *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (linking section 101 exclusions to “the basic tools of scientific and technological work”); Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1029–30 (1990) (articulating normative justifications for the exclusion from patent eligibility in the software arts generated by *Benson*).

¹⁰³ See *O’Reilly v. Morse*, 56 U.S. 62, 113 (1853) (expressing concern about a broad claim encompassing too many after-arising technologies).

¹⁰⁴ See *Bilski v. Kappos*, 130 S. Ct. 3218, 3252–57 (2010) (Stevens, J., concurring) (addressing the patent policy that supports a categorical exclusion of business methods).

¹⁰⁵ Kevin Emerson Collins, *Propertizing Thought: Utilitarian Concerns*, 35–42 (April 17, 2006) (draft on file with Lewis & Clark Law Review).

¹⁰⁶ Kevin Emerson Collins, *Constructive Nonvolition in Patent Law and the Problem of Insufficient Thought Control*, 2007 WIS. L. REV. 759, 760–63.

¹⁰⁷ *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 481 (1974).

¹⁰⁸ Collins, *Semiotics*, *supra* note 101, at 1427–30 (framing a patentee’s disclosure obligations as a structural limit on the nature of the novel, nonobvious, and useful inventions that a patentee can claim); see also Kevin Emerson Collins, *Propertizing Thought*, 60 S.M.U. L. REV. 317, 357–60 (2007) [hereinafter Collins, *Propertizing Thought*] (same).

having only marginal relevance to the gross bulk of the doctrine’s on-the-ground effects.¹⁰⁹

Second, the isolation of the distinct concepts invoked by the phrase “an unpatentable abstract idea” facilitates the tailoring of section 101 doctrine, and thus, the exclusions from patent eligibility that it entails, to its normative justifications. The distinct concepts of an unpatentable abstract idea implicate distinct normative problems, and there is no reason to suspect *ex ante* that a single doctrinal rule-set is the most effective rule-set to fix all of the distinct problems. Rather, it is reasonable to anticipate that different rule-sets may be needed to address the different problems.¹¹⁰ For example, following the notion that the doctrine of patent eligibility is a single, undifferentiated doctrine, the Federal Circuit has insisted that the Supreme Court’s “claim-as-a-whole” approach to patent eligibility articulated in *Diehr* must govern all patent-eligibility doctrine, including all restrictions on the patenting of abstract ideas.¹¹¹ However, this insistence on a one-size-fits-all approach to unpatentable abstract ideas needlessly takes tools out of the tool kit.¹¹² The opposite approach—namely, a “point-of-novelty” or “patentable-weight” approach—may be what is required to most effectively curtail the patenting of one type of abstract idea (e.g., a mental process) whereas the “claim-as-a-whole” approach may be the most effective means of curtailing patent eligibility in other contexts.¹¹³

Third, identifying the distinct types of unpatentable abstract ideas enables more nuanced, normative positions concerning the optimal robustness of the doctrine of patent eligibility in the future. If the prohibition on claims to unpatentable abstract ideas is a singular, albeit vague, concept that stands as a gatekeeper to patent eligibility, then one is forced to be either a minimalist or maximalist about patent eligibility in general. However, it is perfectly reasonable to believe that one concept

¹⁰⁹ The inability to identify with precision the normative justifications of the doctrine of patent eligibility, in turn, makes the doctrine (and its potentially welfare-enhancing restrictions on the reach of patent protection) more likely to wither on the judicial vine.

¹¹⁰ A related benefit of disambiguation is that the inscrutability of one concept of an unpatentable abstract idea need not undermine the coherence of other concepts.

¹¹¹ *In re Bilski*, 545 F.3d 943, 958 (Fed. Cir. 2008) (en banc), *aff’d on other grounds*, 130 S. Ct. 3218 (2010).

¹¹² In fact, it even ignores the diversity of rule-sets that patent doctrine already employs to address patent eligibility issues. The long-standing printed matter doctrine is (in part, at least) a facet of the doctrine of patent eligibility, and it openly embraces “a patentable-weight” or “point-of-novelty” approach that contradicts the “claim-as-a-whole” approach articulated in *Diehr*. See Collins, *Semiotics*, *supra* note 101, at 1396–1400.

¹¹³ *Id.* at 1430–31 (arguing that a patentable weight approach should be adopted to restrict the reach of patents into the human mind, but that a “claim as a whole” approach should be adopted in other contexts). Cf. Collins, *Propertizing Thought*, *supra* note 108, at 355–57 (discussing the mental steps doctrine and its point of novelty approach to patent eligibility).

of an unpatentable abstract idea—say, the prohibition on claims describing intangible, extra-mental embodiments—should remain narrow while simultaneously arguing that another—say, the prohibition on claims to mental processes—should grow more robust. Only once the distinct concepts of an unpatentable abstract idea are identified can a more tailored, part-minimalist, part-maximalist approach to patent eligibility be articulated.

Fourth, the prohibitions on the distinct concepts of an unpatentable abstract idea relate to patent law's other validity doctrines—including the novelty, nonobviousness, utility, and disclosure doctrines—in different ways. A common argument in favor of a narrow section 101 exclusion from patent eligibility is that these other validity doctrines already do all of the work needed to restrict the reach of patent protection to its normatively desired limits (or, in a weaker form, could readily be adjusted to do that work).¹¹⁴ This argument comes into sharper focus—and its limits become more evident—when each concept of an unpatentable abstract idea is considered individually. For example, when the problem is an *O'Reilly* problem of excessive abstraction in claim language, there is a reasonable argument that the disclosure doctrines of section 112, paragraph 1 do, could, and/or should do the needed work.¹¹⁵ However, when the problem is that claims describe either newly invented mental processes or insufficiently tangible extra-mental embodiments, the let-other-doctrines-do-the-needed-work argument misses the mark.

Fifth, although the disambiguation of an unpatentable abstract idea may complicate matters in the short run because courts and the PTO must identify the distinct concepts at work, it would simplify the judicial, case-by-case factual analysis required to identify claims to unpatentable abstract ideas in the long run. In response to the Supreme Court's opinion in *Bilski*, the PTO issued interim guidelines for its examiners to use when determining what constitutes an unpatentable abstract idea.¹¹⁶ The guidelines provide several densely packed pages of factors relevant to what constitutes a claim to an unpatentable abstract idea found in Supreme Court and Federal Circuit precedent, and they instruct examiners that “every relevant factor should be carefully weighed before making a conclusion” in difficult cases.¹¹⁷ If an unpatentable abstract idea

¹¹⁴ See Kevin Emerson Collins, *Claims to Information Qua Information and a Structural Theory of Section 101*, 4 J.L. & POL'Y INFO. SOC'Y 11, 15 (2008) (discussing the “appendix” theory of patent eligibility, under which the doctrine may have “served a useful function in the past, but today it is no longer necessary because any claim that is unpatentable under the patentable subject matter doctrine is also invalid under one of the now-refined invalidity doctrines”).

¹¹⁵ Dan L. Burk & Mark A. Lemley, *Inherency*, 47 WM. & MARY L. REV. 371, 404 n.161 (2005) (arguing that *O'Reilly* is an enablement case).

¹¹⁶ Interim Guidance for Determining Subject Matter Eligibility for Process Claims in View of *Bilski v. Kappos*, 75 Fed. Reg. 43922 (July 27, 2010).

¹¹⁷ *Id.* at 43927.

is a singular, unambiguous concept, then this is what examiners—and, eventually, judges—must do in every case. In contrast, if there were several distinct concepts of an unpatentable abstract idea, the number of factors relevant in any given case would be smaller because not all precedents would bear on every single future case.¹¹⁸

IV. CODA: WHY ARE THE *BILSKI* CLAIMS UNPATENTABLE ABSTRACT IDEAS?

Justice Kennedy’s majority opinion in *Bilski* relies heavily on the concept of an unpatentable abstract idea as developed in *Benson* and *Flook* in its explanation of why all of *Bilski*’s claims are not eligible for patent protection. The Court summarized *Benson*, *Flook*, and *Diehr* at length.¹¹⁹ It labeled the “basic concept of hedging” as “an unpatentable abstract idea, just like the algorithms at issue in *Benson* and *Flook*.”¹²⁰ Following *Flook*, it held that *Bilski*’s narrower claims limited to hedging in particular markets and employing particular formulas were akin to “limiting an abstract idea to one field of use or adding token post-solution components” and thus did not create patent eligible subject matter.¹²¹ Embracing the preemption language from *Benson*, it concluded that “[a]llowing petitioners to patent risk hedging would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.”¹²²

It is too early to determine how later judicial opinions—including the Court’s own subsequent opinions—will interpret *Bilski*, as the reasoning in *Bilski* offers only the roughest of sketches concerning what constitutes an unpatentable abstract idea and leaves much for further refinement.¹²³ However, the taxonomy of distinct types of claims to unpatentable abstract ideas developed above in Part II suggests one interpretive frame for *Bilski*. By opting to base its reasoning in *Bilski* on the *Benson-Flook-Diehr* line of cases, the Court implicitly concludes that the problem with the claims at issue is that they describe abstract (i.e., insufficiently applied) embodiments of a “basic concept.” If this

¹¹⁸ It is, however, possible for more than one concept of an unpatentable abstract idea to be at issue in any given case. For example, the claim language may be excessively general and the claimed embodiments may be insufficiently tangible at the same time.

¹¹⁹ *Bilski v. Kappos*, 130 S. Ct. 3218, 3230 (2010).

¹²⁰ *Id.* at 3231.

¹²¹ *Id.*

¹²² *Id.*

¹²³ Miller, *supra* note 8, at 7 (describing the Supreme Court’s rationale for labeling the claim as an unpatentable abstract idea as “more a gesture than an analysis”).

interpretation of *Bilski* were to prevail, then there would be two principal difficulties moving forward that merit attention.¹²⁴

The first difficulty is a problem that exists even for claims very similar to the claims at issue in *Benson*, *Flook*, and *Diehr* that involve computers programmed to perform mathematical operations. It is the classic vagueness question about how abstract is too abstract.¹²⁵ *Bilski* filed both a broad, independent claim and a number of narrower, dependent claims that limited his method to the use of particular algorithms in particular markets.¹²⁶ Yet, even *Bilski*'s narrower claims were not patent eligible applications of "the basic concept of hedging."¹²⁷ This leaves an open question: What types of additional claim limitations reciting particular uses of the "basic concept," if any, would successfully transform *Bilski*'s claims into patent eligible applications of the "basic concept" under *Benson*, *Flook*, and *Diehr*?

The second difficulty, however, is both more fundamental and arguably new with the Supreme Court's invocation of unpatentable abstract ideas to explain why the claims in *Bilski* are not eligible for patent protection. If *Bilski* draws on *Benson* and *Flook*, and thus the notion of embodiments that are too abstract in the sense of being insufficiently applied, *Bilski* radically expands the core set of phenomena that raise red flags under *Benson* and *Flook*. Before *Bilski*, the reasoning in the *Benson-Flook-Diehr* line of cases could reasonably be read as governing only claims implicating natural principles, scientific truths, laws of nature, mathematical algorithms, and the like. Broadly construed, these categories can be roughly classified as true factual statements that represent the workings of the actual world.¹²⁸ The "basic concept of hedging," however, is difficult to categorize as a natural principle, a scientific truth, a law of nature, or a mathematical algorithm.¹²⁹ In fact, it doesn't seem to implicate a statement about the workings of the actual world at all. Hedging is simply an action, just like mixing, turning, and hitting are actions. By holding that the "basic concept of hedging" is an

¹²⁴ An alternative interpretation is that *Bilski* only raises an *O'Reilly* problem of excessively general claim language. See *supra* Part II.C. The difficulty with identifying the *Bilski* holding as an *O'Reilly* problem is that the Court did not even uphold the narrower, dependent claims that used much more specific claim language. See *infra* text accompanying notes 126–27.

¹²⁵ See *supra* text accompanying notes 70–75.

¹²⁶ *Bilski*, 130 S. Ct. at 3224.

¹²⁷ *Id.* at 3231.

¹²⁸ It is possible to construe *Benson*, *Flook*, and *Diehr* even more narrowly as addressing only *natural* principles or laws of *nature* and not principles of *man-made* entities or laws of *social phenomena*. *Prometheus Labs., Inc. v. Mayo Collaborative Servs.*, No. 04-CV-1200-JAH, 2008 WL 878910, at *6–9 (S.D. Cal. Mar. 28, 2008) (identifying a correlation as a natural phenomenon and treating this finding as necessary to its legal conclusion that the claim at issue was patent ineligible).

¹²⁹ Cf. *Bilski*, 130 S. Ct. at 3235 (Stevens, J., concurring in the judgment) (noting that *Bilski*'s claims are not claims to principles, fundamental truths, phenomena of nature, or mathematical algorithms).

unpatentable abstract idea that is governed by the logic of *Benson*, *Flook*, and *Diehr*, *Bilski* therefore unleashes the doctrinal logic followed in these cases to operate in a much broader arena. This may be problematic because, if broadly applied to all “basic concepts,” *Benson* and *Flook* threaten to undermine the patent eligibility of vast swaths of conventional subject matter.¹³⁰

The crux of the issue becomes evident when one realizes that *all* method claims can be formulated as claims to the “basic concept of [doing X]” applied in a particular technological environment, making it unclear why any method claims are patent eligible. For example, consider a hypothetical claim to the act of “mixing chemicals A and B.” Although this claim would conventionally be considered patent eligible, why it is patent eligible under the Supreme Court’s logic in *Bilski* is today a mystery. If “the basic concept of hedging” is an abstract idea, why isn’t “the basic concept of mixing two chemicals together” an abstract idea? The Court seemed concerned that the “basic concept of hedging . . . is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class,”¹³¹ but the basic concept of mixing two chemicals together is presumptively yet more “fundamental” and “long prevalent” in the chemical arts. Furthermore, why isn’t the claim to “mixing chemicals A and B” together a patent-ineligible claim because it simply “limit[s] an abstract idea to one field of use?”¹³² In sum, unless one can articulate a rule to distinguish “the basic concept of hedging” from “the basic concept of mixing two chemicals together,” then the extension of *Benson* and *Flook* in *Bilski* threatens to undermine parts of what is today considered the heartland of patent protection.

Considered in full, there are four possible responses to this conundrum. Based on the notion that the two basic concepts cannot be distinguished, the first two responses require a retreat from the status quo: perhaps *Bilski* was wrongly decided or, yet less imaginably, perhaps methods of mixing chemicals are not patent eligible like we always presumed they were. A third response involves embracing an “I-know-it-when-I-see-it” approach to patent eligibility.¹³³ The mixing of chemicals together is clearly a patent eligible method, so the *Bilski* logic clearly cannot apply. Period. End of analysis. There is no analytical explanation to back up the distinction. The fourth and final response adopts a solve-the-problem-tomorrow approach and posits that the basic concepts of hedging and mixing chemicals are different in some yet-to-be-specified way.

¹³⁰ Cf. *supra* note 89 and accompanying text (arguing that *Benson* and *Flook* create an exception to the default rule under which a claim to an object encompasses all end-uses of the object).

¹³¹ *Bilski*, 130 S. Ct. at 3231.

¹³² *Id.*

¹³³ See *supra* notes 12–13 and accompanying text.

This final answer may seem both reasonable and viable, but there is a curiosity—if not an irony—of which anyone subscribing to this approach should be aware. Looking down the road, the two most self-evident candidates for the linchpin difference between the two “basic concepts” implicate the very two approaches to patent eligibility that the Supreme Court expressly chose not to embrace in its *Bilski* majority opinion. First, one could argue that hedging, but not mixing chemicals, involves a method of conducting business, or perhaps more broadly a method of “organizing human activity.”¹³⁴ However, the majority opinion in *Bilski* leads away from this argument insofar as it expressly rejects the notion put forward in Justice Stevens’ concurrence that business methods are categorically excluded from patent protection.¹³⁵ Second, one could argue that hedging fails to transform the material world in the way that mixing chemicals does. However, the majority opinion in *Bilski* leads away from this argument, too. The most advanced test for assessing the connection of an invention to the material world is the machine-or-transformation test, yet the majority rejected the test as the sole test for patent eligibility,¹³⁶ refused to review the Federal Circuit’s application of the test to *Bilski*’s claims, and even questioned the test’s relevance when dealing with “Information Age” inventions.¹³⁷ Thus, to move forward, the Court may first have to look back and revisit its own reasoning. By augmenting the importance of the patent ineligibility of abstract ideas as a gatekeeper of the patent regime, the majority opinion in *Bilski* on its surface appears to divert attention away from business methods and intangibility as the gatekeepers of patent eligibility. Yet, upon closer inspection, the reason why the *Bilski* claims are unpatentable abstract ideas may in fact turn out to hinge on nothing more than their status as methods of conducting business or methods that fail the machine-or-transformation test.

¹³⁴ *Bilski*, 130 S. Ct. at 3234 (Stevens, J., concurring) (quoting *In re Bilski*, 545 F.3d 943, 974 (Fed. Cir. 2008) (en banc) (Dyk, J., concurring), *aff’d on other grounds*, 130 S. Ct. 3218 (2010)).

¹³⁵ *Id.* at 3228–29. *But see id.* at 3229 (noting that “if the Court of Appeals were to succeed in defining a narrower category or class of patent applications that claim to instruct how business should be conducted, and then rule that the category is unpatentable because, for instance, it represents an attempt to patent abstract ideas, this conclusion might well be in accord with controlling precedent”).

¹³⁶ *Id.* at 3225–28.

¹³⁷ *Id.* at 3227–28. Justice Kennedy never clarifies whether hedging is an “Information Age” technology, so the relevance of the machine-or-transformation test remains unclear. If this argument from tangibility eventually carries the day, then the Supreme Court did the patent community a disservice by refusing to examine the “clue” provided by the machine-or-transformation test, as this test was the Federal Circuit’s first take on the difficult job of sorting claims on a spectrum of tangible to intangible.

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“AN UNPATENTABLE ABSTRACT IDEA”

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V. CONCLUSION

Given the importance that the Supreme Court’s opinion in *Bilski* attributes to unpatentable abstract ideas as the gatekeeper of patent eligibility, it is critical for courts and the PTO to recognize that they must address not only the problem of vagueness but the problem of ambiguity as well. The phrase “an unpatentable abstract idea” has several distinct meanings in several distinct contexts, and the first task on the priority list after *Bilski* should be to identify what these several distinct meanings have been as a historical matter and should be as a normative matter.