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# *How to Patent Business, Software, and Medical Diagnostic Methods in the Aftermath of the Bilski Decision—Part 1*

**Paul R. Juhasz**

*Paul R. Juhasz is a founder of The Juhasz Law Firm<sup>1</sup> in Houston, TX. He has been a practicing patent attorney for over 25 years, beginning his career at Pennie & Edmonds in New York and continuing on to work for such companies as Nokia as Director IP America of intellectual property in the Western Hemisphere, Symbol as VP IP and Assistant General Counsel where he served as Chairman of the Lemelson Joint Defense Group of companies that defeated the Lemelson patents, and the law firm of Williams, Morgan & Amerson in Houston, TX where he was a partner. This article represents the views and analysis of the author alone and not of Juhasz Law or any other company. For more on Juhasz Law visit the Firm's Web site at [www.patenthorizon.com](http://www.patenthorizon.com). The author thanks Chris Frerking for reviewing the text and providing valuable feedback. © 2010.*

In *In re Bilski*,<sup>2</sup> a decision handed down on June 28, 2010, the US Supreme Court was asked to decide whether a claim on a business method is patentable subject matter under 35 U.S.C. § 101. The Federal Circuit had affirmed the Patent Office rejection of the Bilski patent business method claims as non-patentable subject matter under a newly formulated “machine or transformation” test. The Supreme Court affirmed the judgment of the Federal Circuit in rejecting the Bilski patent claims but under the Court’s precedents on the unpatentability of abstract ideas and not on the machine-or-transformation test adopted by the Federal Circuit.

This two-part article explores what the Supreme Court’s decision on the law of patentable subject matter is all about and what the opinion means to the patenting of business, software, and medical diagnostic methods. Part 1 explores what the Supreme Court opinion says on the law of 35 U.S.C. § 101 and the standard for defining patentable subject matter. The tension between Section 101 and Sections 102/103 is explored along with analysis

of how the “new and useful” standard of Section 101 differentiates from Sections 102/103 anticipation/obviousness.

Part 2, which will appear in the November issue of *The IP Litigator*, delves deeper into what the Court’s opinion means to the patenting of business, software, and medical diagnostic methods providing several practice pointers for use in drafting claims narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself.

## **Facts in the Case**

In *Bilski*, the plaintiff-appellant, Bernard L. Bilski and Rand A. Warsaw sought patent protection on a claimed invention that explains how buyers and sellers of commodities in the energy market can protect, or hedge, against the risk of price changes.<sup>3</sup> Claim 1 recites the following series of steps instructing how to hedge risk:

1. A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:
  - i. initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumer;
  - ii. identifying market participants for said commodity having a counter risk position to said consumers; and
  - iii. initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.

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Claim 4 puts the concept into a simple mathematical formula and the dependent claims explain how the independent claims can be applied to allow energy suppliers and consumers to minimize risks resulting from fluctuations in market demand for energy.<sup>4</sup>

The patent examiner rejected petitioners' application, explaining that it "is not implemented on a specific apparatus and merely manipulates [an] abstract idea and solves a purely mathematical problem without any limitation to a practical application, therefore, the invention is not directed to the technological arts."<sup>5</sup> The Board of Patent Appeals and Interferences affirmed, concluding that the application involved only mental steps that do not transform physical matter and was directed to an abstract idea.<sup>6</sup> The US Court of Appeals for the Federal Circuit heard the case *en banc* and on October 30, 2008, affirmed under a "machine-or-transformation test."<sup>7</sup> In so holding, the Federal Circuit rejected its prior test for determining patentability—whether it produces a "useful, concrete, and tangible result;"—concluding that the "machine-or-transformation test" is "the sole test governing § 101 analyses," and thus the "test for determining patent eligibility of a process under § 101."<sup>8</sup> *Bilski* and *Warsaw* petitioned the US Supreme Court for a writ of certiorari. On June 1, 2009, the Supreme Court granted certiorari.<sup>9</sup>

The case attracted wide-spread attention because of the implications the decision could have on business patents already issued, and the patentability of computer software and medical diagnostic therapeutic innovation.

On June 28, 2010, the Supreme Court affirmed the judgment of the Federal Circuit in rejecting the *Bilski* patent claims but under the Court's precedents on the unpatentability of abstract ideas and not on the machine-or-transformation test adopted by the Federal Circuit. Justice Kennedy delivered the opinion of the Court and Chief Justice Roberts and Justices Thomas and Alito joined the opinion in full. Justice Scalia joined except for Parts II-B-2 and II-C-2. Retiring Justice Stevens filed an opinion concurring in the judgment, in which Justices Ginsburg, Breyer, and Sotomayer joined. Justice Breyer filed an opinion concurring in the judgment and providing further observations, in which Justice Scalia joined as to Part II.

## The Supreme Court Decision

The starting point for the Court's analysis of what subject matter is patentable is Title 35 U.S.C. § 101 which provides for the issuance of a patent to a person who invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.<sup>10</sup> Despite the apparent sweep of Section 101, the Court pointed to

three categories of subject matter that are not entitled to patent protection: "laws of nature, physical phenomena, and abstract ideas."<sup>11</sup>

The *Bilski* application involved an invention claimed to be a "process" under Section 101, which is defined under Section 100(b) to be a "process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."<sup>12</sup> The Court found no reason for interpreting the term "process" other than as taking its ordinary, contemporary, common meaning.<sup>13</sup> *The Court found the Federal Circuit's tying of the term "process" to "a machine or transformation of an article" as the sole test for what constitutes a "process" to violate the ordinary, contemporary, common meaning of the term "process." (emphasis added).*<sup>14</sup> The Court stated that the Court's precedents establish that the machine-or-transformation test, while "a useful and important clue, an investigative tool, for determining whether some claimed inventions are processes under Section 101," is not the sole test for making that determination.<sup>15</sup> In deciding whether previously unforeseen inventions qualify as patentable "processes," the Court even posited that "it may not make sense to require courts to confine themselves to asking the questions posed by the machine-or-transformation test."<sup>16</sup>

Turning to the question of the patentability of business methods, the Court explained that the term "method" as found in the definition of a "process" under Section 100(b) may include "at least some methods of doing business."<sup>17</sup> Hence, Section 101 precludes the broad contention that the term "process" categorically excludes business methods.<sup>18</sup> In addition, 35 U.S.C. § 273(b)(1) provides that if a patent holder claims infringement based on "a method in [a] patent," the alleged infringer can assert a defense of prior use,<sup>19</sup> a legislation predicated on the existence of business methods. A conclusion that business method patents are not patentable in any circumstances would render Section 273 meaningless.<sup>20</sup>

As a business method, the *Bilski* application is not categorically outside of Section 101 the Court stated. Rather than resolve *Bilski* by adopting a categorical rule that might have wide-ranging and unforeseen impacts, the Court resolved *Bilski* on the basis of the Court's decisions in *Benson*, *Flook*, and *Diehr*.<sup>21</sup> As stated by the Court "[i]ndeed, all members of the Court agree that the patent application at issue here falls outside of § 101 because it claims an abstract idea."<sup>22</sup>

The Court rejected the *Bilski* application under its precedents on the unpatentability of abstract ideas providing little further guidance on what constitutes a patentable "process" other than "pointing to the definition of that term provided in Section 100(b) and looking to the guideposts in *Benson*, *Flook*, and *Diehr*."<sup>23</sup>

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Finally, the Court stated that nothing in today's opinion should be read as endorsing interpretations of Section 101 that the Court of Appeals for the Federal Circuit has used in the past.<sup>24</sup>

## Concurring Opinions of Justices Stevens and Breyer

The Court was unanimous in affirming the judgment of the Federal Circuit in rejecting the *Bilski* patent claims and finding that the machine-or-transformation test is not the exclusive test for what constitutes a patentable "process" under 35 U.S.C. § 101. Otherwise, the Court was split on the rationale in support of the judgment, with the majority making broad statements about how to define the term "process" in Section 101 and tinkering with the bounds of the category of unpatentable, abstract ideas while the minority "restoring patent law to its historical and constitutional moorings"<sup>25</sup> concluded that a method of doing a business is not, in itself, covered by the statute—"a method of doing business is not a 'process' under Section 101."<sup>26</sup>

Justice Scalia refrained from joining the majority on Parts II-B-2 and II-C-2; joining instead part II of an opinion by Justice Breyer.<sup>27</sup> In Part II-B-2 of the majority the Court, among other things, posited that in deciding whether previously unforeseen inventions qualify as patentable "processes," "it may not make sense to require courts to confine themselves to asking the questions posed by the machine-or-transformation test."<sup>28</sup> In Part II-C-2 of the majority the Court, among other things, spoke to the need to set a high enough bar to keep patent examiners and courts from being flooded with claims flowing from an Information Age that empowers people with new capacities to perform statistical analyses and mathematical calculations with a speed and sophistication that enable the design of protocols for more efficient performance of a vast number of business tasks.<sup>29</sup> In Part II of his concurring opinion, Justice Breyer explained, among other things, that "in reemphasizing that the machine-or-transformation test is not necessarily the sole test of patentability, the Court intends neither to de-emphasize the test's usefulness nor to suggest that many patentable processes lie beyond its reach."<sup>30</sup>

Justice Scalia's split concurrence may be a reflection of a shift in the jurisprudence of the Court during deliberations in deciding this case wherein the majority perhaps initially resided under the stewardship of Justice Stevens only to be lost to Justice Kennedy somewhere along the process. This also may explain the length of time it took for the Court to render its decision after hearing oral arguments; a period of time that counts among the longest in the recent history of deciding patent cases.

The joining of Justice Scalia in Justice Breyer's concurring opinion may portend that the line in the sand has not yet been so clearly drawn at least with respect to the patentability of software and medical diagnostic patents suggesting that business method patents generally may continue to be more strictly construed as the concurring opinions would have it.

## Definition of Section 101 and *Benson, Flook, and Diehr* Precedent Provide Section 101 Process Patentability Guidance

The Court rejected the *Bilski* application under its precedents on the unpatentability of abstract ideas providing little further guidance on what constitutes a patentable "process" other than "pointing to the definition of that term provided in Section 100(b) and looking to the guideposts in *Benson, Flook, and Diehr*."<sup>31</sup>

So what are the guidelines provided by this trilogy of Supreme Court decisions?

In *Benson*, the Court considered whether a patent application for an algorithm to convert binary-coded decimal numerals into pure binary code was a "process" under Section 101. The claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use. They purported to cover any use of the claimed method in a general purpose digital computer of any type.<sup>32</sup> The Court held that the application at issue was not a "process" but an unpatentable abstract idea.<sup>33</sup>

Here the "process" claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus. In 56 U.S. 111 [But] the Court denied the eighth claim in which Morse claimed the use of "electro magnetism, however developed for marking or printing intelligible characters, signs, or letters, at any distances." *Id.* at 56 U.S. 112.<sup>34</sup>

As the Court later explained a contrary holding "would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself."<sup>35</sup>

Unlike the algorithm in *Benson*, the mathematical formula used for monitoring conditions during the catalytic conversion process in the petrochemical and oil-refining



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industries in *Flook* was limited so that it could still be freely used outside the petrochemical and oil-refining industries.<sup>36</sup> Nevertheless, the *Flook* Court rejected “[t]he notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process.”<sup>37</sup> As the Court later stated in *Diehr*, *Flook* stands for the proposition that the prohibition against patenting abstract ideas “cannot be circumvented by attempting to limit the use of the formula to a particular technological environment” or adding “insignificant post solution activity.”<sup>38</sup>

Finally, in *Diehr*, involving a method for molding raw, uncured synthetic rubber into cured precision products using a mathematical formula to complete several of the steps by computer, the Court explained that “while an abstract idea, law of nature, or mathematical formula could not be patented, an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”<sup>39</sup>

## The Term “Abstract Ideas” as an Exception to Section 101 Patentability Likely Includes “Formulas” and “Mental Processes”

Justice Stevens criticized the *Bilski* decision for failing to show how *Bilski*’s application qualifies as an abstract idea under the case law because it is not “[a] principle, in the abstract,” or a “fundamental truth” or “the sort of phenomenon of nature or abstract idea that was embodied by the mathematical formula at issue in *Benson* and *Flook*.”<sup>40</sup> Justice Stevens was referring to the “abstract idea” category of the three categories of subject matter that the *Bilski* majority explained are not entitled to patent protection, namely, “laws of nature, physical phenomena, and abstract ideas.”<sup>41</sup>

The guidelines in *Benson* would appear to bridge this ostensible analytical gap in *Bilski* when it states that “mental processes” and “abstract intellectual concepts” are indeed exceptions to patent protection under Section 101: “[p]henomena of nature, though just discovered, *mental processes*, and *abstract intellectual concepts* are not patentable” under Section 101, since allowing individuals to patent these fundamental principles would “wholly pre-empt” the public’s success to the “basic tools of scientific and technological work.”(emphasis added)<sup>42</sup>

The Court found the *Bilski* application to claim an “abstract idea” because the “Petitioners seek to patent both the concept of hedging risk and the application of that concept to energy markets.”<sup>43</sup> It would appear to be

in the recitation of a process containing nothing more than “abstract concepts,” “mental processes,” and “formulas,” that the *Bilski* claims amount to an abstract idea contrary to the concerns voiced by Stevens.

## Section 101 “New” Does Not Equal Section 102 “Novel” and the Role of Section 101 “Useful” As a Section 101 Bar

Justice Stevens faulted the Court’s reliance on the long prevalence of hedging in commerce in construing Section 101; a provision that does not involve the issue of novelty arising under Section 102.<sup>44</sup> The tension between Section 101 and Sections 102/103 that may have been created by the Court’s citation to prior art to show the *Bilski*’s claims to be an abstract idea may be unfounded given the Court’s apparent appreciation of Sections 102, 103, and 112 as requirements for patentability under the patent statutes.<sup>45</sup> As the Court stated “[i]n order to receive patent protection, any claimed invention must [also] be novel, 102, nonobvious, 103, and fully and particularly described, 112.”<sup>46</sup>

The question then becomes, if not for a Section 102 purpose, then for what purpose did the Court rely on the long prevalence of hedging in commerce in construing Section 101? The answer appears to lie in the meaning of the terms “new” and “useful” under Section 101.

The precedent of the Court suggests that the term “new” likely means that which is not a “manifestation[s] of . . . nature, free to all men and reserved exclusively to none.”<sup>47</sup> In 1948, *Funk Brother Seed Co. v. Kalo Inoculant Co.* confronted the Section 101 question of patentability head on and held that naturally-occurring products of nature are excluded from patentable subject matter.<sup>48</sup> *Funk* focused on whether mixtures of certain bacteria were patentable.<sup>49</sup> In *Funk*, a patent had issued for mixed cultures of root nodule bacteria capable of inoculating the seeds of leguminous plants.<sup>50</sup> The crux of the Court’s finding was that the combining of the bacteria species did not produce new bacteria, nor did it cause a change in any of the six species of bacteria, but served more of a packaging function.<sup>51</sup> The Court stated that:

[e]ach species has the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.<sup>52</sup>

The Court further offered, in an often cited language of the case that:

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[p]atents cannot issue for the discovery of the phenomena of nature. . . . [They] are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none.<sup>53</sup>

The US Supreme Court precedents have clearly and consistently held that products of nature are not patentable.<sup>54</sup>

In 1980, the US Supreme Court applied the product of nature doctrine in the area of biological organisms in *Diamond v. Chakrabarty*, holding that when an inventor introduced new genetic material within a bacterium cell, he had produced (*i.e.*, genetically engineered) something that was not a product of nature and was thus patentable subject matter under 35 U.S.C. § 101.<sup>55</sup> The Court clearly stated again that naturally-occurring products of nature were not patentable.<sup>56</sup> The Court said that the “patentee has produced a new bacterium with markedly different characteristics from any found in nature and one having the potential for significant utility. His discovery is not nature’s handiwork, but his own; accordingly it is patentable subject matter under Section 101.”<sup>57</sup> Specifically, the inventor had added new genetic material into the cell of a bacterium, producing something that did not occur in nature. The court further stated:

The laws of nature, physical phenomena, and abstract ideas have been held not patentable. . . . Thus, a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter. Likewise, Einstein could not patent his celebrated law that  $E = mc^2$ ; nor could Newton have patented the law of gravity. Such discoveries are ‘manifestations of . . . nature, free to all men and reserved exclusively to none.’<sup>58</sup>

Under this precedent of the Court, the term “new” as used in Section 101 likely would require subject matter to be *not* a “manifestation of nature—whether that natural existence is known to man or later discovered.” When applied to the three categories of subject matter that the *Bilski* majority explained are not entitled to patent protection, namely, “laws of nature, physical phenomena, and abstract ideas,” it seems that subject matter falling under either the “law of nature or physical phenomena” exceptions to patentability would never be “new” in the Section 101 sense of the word because laws of nature and physical phenomena appear to be manifestations of nature. On the other hand, whether an abstract idea is a manifestation of nature or a man-made creation would appear to turn on the subject matter of the abstract idea itself.<sup>59</sup> If an “abstract idea” that is a “formula,” for example, is an expression of a law of nature or physical

phenomenon such as Einstein’s theory of relativity, then as a manifestation of nature, such formula would never be patentable as they are not “new” in the Section 101 sense of the word. Nature defines those laws even though man puts those laws into an expression. On the other hand, a formula that is not a manifestation of nature could in fact be “new” in the Section 101 sense of the word. Yet those formulae under the teachings of *Bilski* would still fail to be patentable under Section 101. If failure in that event is not because the formula was not “new” then nonpatentability of the formula must result from the failure of the formula to satisfy the “useful” prong of the Section 101 requirement for patentability. The same can be said for a mental process. A mental process that is a manifestation of nature is not “new” in the Section 101 sense of the word. But a mental process that is not a manifestation of nature and so is “new” in the Section 101 sense of the word still fails Section 101 under *Bilski* so that the failure must occur because the mental process is not “useful.”

In *Bilski* it cannot be said that the process of hedging is a manifestation of nature because hedging would seem to be a man-made contrivance and so the *Bilski* claims would likely be “new” in the Section 101 sense of the word. So the failure of the *Bilski* claims likely turns on the failure of the *Bilski* formula/mental processes to satisfy the “useful” prong of the “new and useful” test for subject matter patentability under Section 101. The precedent of the Court would appear to support such an analysis.

It is hornbook law that the Constitution is the supreme law of the land and so any law passed by Congress pursuant to this Constitutional power necessarily limits the patent to the promotion of “the progress of science and useful arts.”<sup>60</sup> Under the US Constitution Congress is empowered to “promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.”<sup>61</sup> Pursuant to this Constitutional power, Congress has passed a series of patent laws over the years that grant certain exclusive rights over certain inventions and discoveries as a means of encouraging innovation. All of these Congressional laws are limited by the Constitution and the Supreme Court has spoken on this subject on numerous occasions including in *Graham*,<sup>62</sup> in which the Court explored Congress’ power and limitations under the Clause in the context of patent infringement.<sup>63</sup> *Graham* analyzed the limitation in the Progress Clause in the following words:

The clause is both a grant of power and a limitation. This qualified authority, unlike the power often exercised in the sixteenth and seventeenth centuries by the English Crown, is limited to the promotion of advances in the “useful arts.” It was

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written against the backdrop of the practices [...] of the Crown in granting monopolies to court favorites in goods or businesses which had long before been enjoyed by the public. [...] The Congress in the exercise of the patent power may not overreach the restraints imposed by the stated constitutional purpose. Nor may it enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby.<sup>64</sup>

It is in the “promotion of advances in the useful arts” where support may be found for the term “useful” under Section 101. As the Supreme Court has explained “[t]he patent system represents a carefully crafted bargain that encourages both the creation and the public disclosure of *new and useful advances in technology*, in return for an exclusive monopoly for a limited period of time.”<sup>65</sup> Federal Circuit precedent has followed these guidelines that patentable processes reside “in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of ‘useful arts.’”<sup>66</sup> The dissent of Judge Mayer in the Federal Circuit decision in *Bilski* explains that “business method patents do not promote the “useful arts” because they are not directed to any technological or scientific innovation.”<sup>67</sup>

If “an abstract idea or mental process” that is “new” in the Section 101 sense since it is not a manifestation of nature nonetheless still fails Section 101 then it must fail because it is not “useful” or as precedent suggests it is not an “innovation that promotes the advancement in the useful arts.” The *Bilski* claims likely failed not because they were not “new” in the Section 101 sense; rather because as abstract concepts, mental processes, and formulae they did not promote the advancement of the useful arts and hence failed the “useful” prong of the Section 101 “new and useful” test for determining the patentability of subject matter.

Through this prism of understanding, the reliance by the Court on the long prevalence of hedging in commerce in construing Section 101 may become clearer. The probative value of “hedging” may lie in it being an abstract concept, mental process, and formula that does not promote the advancement of the useful arts and hence fails the “useful” prong of the Section 101 “new and useful” test for determining the patentability of subject matter. Under this view, the operative word is “hedging” and not “long prevalence,” which serves only to describe the operation temporarily. If, however, the operative word is “long prevalence,” then under the alternative view that any pure mental process is manifested entirely within the brain and so is a creation of nature and hence is never “new” in the Section 101 sense of the word *per se* (no one is actually making or building anything—it is only going on inside one’s head)<sup>68</sup> the term “long prevalence”

may show “hedging” to be an abstract idea that has been going on in people’s heads for a long time.

Under the former view, only abstract ideas that are “new” in the Section 101 sense of the word could ever be candidates for Sections 102/103 analysis. But those abstract ideas, like the abstract idea of *Bilski*, would never advance to a Section 102/103 analysis because even though being “new” in the Section 101 sense of the word, they are not “useful” and so fail the “useful” prong of the “new and useful” requirement for patentable subject matter. Under the latter view, that any pure mental process is manifested entirely within the brain, all abstract ideas would fail Section 101 because they are not “new” in the Section 101 sense of the word and so all abstract ideas would never advance to a Sections 102/103 analysis for that reason.

The separateness of Section 101 from Sections 102/103 is perhaps best seen under the former view but with a different kind of abstract idea. In this example, instead of being an abstract idea such as “hedging,” which has been in “long prevalence,” the abstract idea is one that has never before been expressed by man. In this example, if the abstract idea could pass beyond Section 101 to a Sections 102/103 analysis (which it can’t under the *Bilski* analysis), the abstract idea may very well pass the Sections 102/103 test because in this example the abstract idea had never before been expressed by man. But the Section 101 gate of patentability would never let this or any other abstract idea advance to that Sections 102/103 analysis because an abstract idea albeit “new” does not promote the advancement of the useful arts and hence fails the “useful” prong of the Section 101 “new and useful” test for determining the patentability of subject matter. The separateness of Section 101 from Sections 102/103 is not so transparent in the latter view that assumes all abstract ideas are never “new” in the Section 101 sense of the word because they are manifested entirely within the brain.

The tension that *Bilski* may have introduced between Section 101 and Sections 102/103 when the Court cited prior art to show that *Bilski*’s claims were an abstract idea is likely defused when viewing the abstract idea of *Bilski* as perhaps failing the “useful” prong of the Section 101 “new and useful” standard as opposed to DNA sequences, for instance, which are more likely to be strictly scrutinized with respect to the “new” prong of the Section 101 “new and useful” standard.

## ***Flook and Diehr* Precedent on “Technological Limitation” and “Post-Solution Activity”**

Unlike the algorithm in *Benson*, the mathematical formula used for monitoring conditions during the catalytic

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conversion process in the petrochemical and oil-refining industries in *Flook* was limited so that it could still be freely used outside the petrochemical and oil-refining industries.<sup>69</sup> Nevertheless, the *Flook* Court rejected “[t]he notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process.”<sup>70</sup> Claim 1 of *Flook* recited:

1. A method for updating the value of at least one alarm limit on at least one process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons wherein said alarm limit has a current value of “Bo + K” “wherein Bo is the current alarm base and K is a predetermined alarm offset which comprises:
  - i. Determining the present value of said process variable, said present value being defined as PVL;
  - ii. Determining a new alarm base B1, using the following equation: “ $B1 = Bo(1.0-F) + PVL(F)$ ” where F is a predetermined number greater than zero and less than 1.0;
  - iii. Determining an updated alarm limit which is defined as B1 + K; and thereafter
  - iv. Adjusting said alarm limit to said updated alarm limit value.

The Court explained that an “alarm limit” is a number associated with a process variable that when exceeded during catalytic conversion processes may signal the presence of an abnormal condition indicating either inefficiency or perhaps danger.<sup>71</sup> During transient operating situations, such as start-up, it may be necessary to “update” the alarm limits periodically.<sup>72</sup> *Flook*’s patent application described a three step method of updating alarm limits: an initial step which merely measures the present value of the process variable (*e.g.*, the temperature); an intermediate step which uses an algorithm to calculate an updated alarm limit value; and a final step in which the actual alarm limit is adjusted to the updated value.<sup>73</sup>

As to “insignificant post solution activity” the Court found it significant that the patent application did not contain any disclosure relating to the chemical processes at work, the monitoring of process variables, or the means of setting off an alarm or adjusting an alarm system.<sup>74</sup> All that it provided was a formula for computing an updated alarm limit.<sup>75</sup> Although the computations can be made by pencil and paper calculations, the abstract of disclosure made it clear that *the formula is primarily useful for computerized calculations producing automatic adjustments in alarm settings.*<sup>76</sup>

As to “technological limitations” the Court found it significant that the patent claims covered any use of respondent’s formula for updating the value of an alarm limit on any process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons.<sup>77</sup> Because there are numerous processes of that kind in the petrochemical and oil-refining industries, the claims cover a broad range of potential uses of the method.<sup>78</sup> As the Court explained they do not, however, cover every conceivable application of the formula.

The Court appeared to focus on *Flook*’s application simply providing a new and presumably better method for calculating alarm limit values.<sup>79</sup> As stated by the *Flook* Court

If we assume that that method was also known, as we must under the reasoning in *Morse*, then respondent’s claim is, in effect, comparable to a claim that the formula can be usefully applied in determining the circumference of a wheel. As the Court of Customs and Patent Appeals has explained, if a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory. *In re Richman*, 563 F.2d 1026, 1030 (1977).<sup>80</sup>

The reasoning of *Morse* referred to by the *Flook* Court likely refers to the Court’s striking down as unpatentable subject matter a claim which recited that “every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs, or letters at a distance.”<sup>81</sup> As the *Morse* Court stated “[b]ut Professor Morse has not discovered, that the electric or galvanic current will always print at a distance, no matter what may be the form of the machinery or mechanical contrivances through which it passes.”<sup>82</sup>

In his dissenting opinion, Justice Rehnquist, the author of the majority in *Diehr* found favor with the analysis taken by the Court of Customs and Patent Appeals that reversed the Board of Appeals’s affirmance of the Examiner’s rejection of the application as nonpatentable subject matter.<sup>83</sup> The CCPA read *Benson* as applying only to claims that entirely preempt a mathematical formula or algorithm, and noted that respondent was only claiming the use of his method to update alarm limits in a process comprising the catalytic chemical conversion of hydrocarbons.<sup>84</sup> The court reasoned that, since the mere solution of the algorithm would not constitute infringement of the claims, a patent on the method would not preempt the formula.<sup>85</sup> The Dissent also was concerned that the Majority “strikes what seems to me an equally damaging



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blow at basic principles of patent law by importing into its inquiry under 35 U.S.C. § 101 the criteria of novelty and inventiveness.”<sup>86</sup>

Nonetheless, as the Court later stated in *Diehr*, a decision that turned the tables on *Flook* with Justice Rehnquist now writing for the Majority and Justice Stevens now in the Dissent, *Flook* stands for the proposition that the prohibition against patenting abstract ideas “cannot be circumvented by attempting to limit the use of the formula to a particular technological environment” or adding “insignificant post solution activity.”<sup>87</sup>

*Diehr* involved a method for molding raw, uncured synthetic rubber into cured precision products using a mathematical formula to complete several of the steps by computer. Claim 1 recites:<sup>88</sup>

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

The Court explained that “while an abstract idea, law of nature, or mathematical formula could not be patented, an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”<sup>89</sup> The *Diehr* Court

affirmed the judgment of the Court of Customs and Patent Appeals because the Court found the claims not as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products:

We have before us today only the question of whether respondents’ claims fall within the § 101 categories of possibly patentable subject matter. We view respondents’ claims as nothing more than a process for molding rubber products, and not as an attempt to patent a mathematical formula. We recognize, of course, that, when a claim recites a mathematical formula (or scientific principle or phenomenon of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract. A mathematical formula, as such, is not accorded the protection of our patent laws, *Gottschalk v. Benson*, 409 U. S. 63 (1972), and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment. *Parker v. Flook*, 437 U. S. 584 (1978). Similarly, insignificant post-solution activity will not transform an unpatentable principle into a patentable process. *Ibid*. To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection. On the other hand, when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (*e.g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101. Because we do not view respondents’ claims as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products, we affirm the judgment of the Court of Customs and Patent Appeals.<sup>90</sup>

In contrasting *Flook*, the *Diehr* Court raised the question that arguably, the claims in *Flook* did more than present a mathematical formula; the claims also solved the calculation in order to produce a new number or “alarm limit” and then replaced the old number with the number newly produced.<sup>91</sup> The *Diehr* Court explained that the claims covered uses of the formula in processes “comprising the catalytic chemical conversion of hydrocarbons” and there are numerous such processes in the petrochemical and oil refinery industries, and the claims therefore covered a broad range of potential uses.<sup>92</sup> The Court recognized that “[t]he claims, however, did not

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cover every conceivable application of the formula.”<sup>93</sup> We rejected in *Flook* the argument that, because all possible uses of the mathematical formula were not preempted, the claim should be eligible for patent protection.<sup>94</sup>

The Court then reconciled its reasoning in *Flook* as consistent with its reasoning in *Diehr*.<sup>95</sup> As the Court explained, “a mathematical formula does not suddenly become patentable subject matter simply by having the applicant acquiesce to limiting the reach of the patent for the formula to a particular technological use.”<sup>96</sup> “A mathematical formula, in the abstract, is nonstatutory subject matter regardless of whether the patent is intended to cover all uses of the formula or only limited uses. Similarly, a mathematical formula does not become patentable subject matter merely by including in the claim for the formula token post-solution activity such as the type claimed in *Flook*.” Significantly, the Court noted that “[w]e were careful to note in *Flook* that the patent application did not purport to explain how the variables used in the formula were to be selected, nor did the application contain any disclosure relating to chemical processes at work or the means of setting off an alarm or adjusting the alarm limit.” (emphasis added)<sup>97</sup> All the application provided was a “formula for computing an updated alarm limit” (emphasis added).<sup>98</sup>

“Diehr’s claims, however, are not limited to the isolated step of ‘programming a digital computer,’” the Court explained.<sup>99</sup> Rather, “they describe a process of curing rubber beginning with the loading of the mold and ending with the opening of the press and the production of a synthetic rubber product that has been perfectly cured—a result heretofore unknown in the art” (emphasis added).<sup>100</sup> The fact that one or more of the steps in respondents’ process may not, in isolation, be novel or independently eligible for patent protection is irrelevant to the question of whether the claims as a whole recite subject matter eligible for patent protection under Section 101. “As the Court explained when discussing machine patents in *Deepsouth Packing Co. v. Laitram Corp.*, 406 U. S. 518 (1972): “The patents were warranted not by the novelty of their elements, but by the novelty of the combination they represented. Invention was recognized because Laitram’s assignors combined ordinary elements in an extraordinary way—a novel union of old means was designed to achieve new ends.”<sup>101</sup> Thus, for both inventions, “the whole in some way exceed[ed] the sum of its parts.”<sup>102</sup> The Court explained that “[i]n order for the dissent to reach its conclusion, it is necessary for it to read out of respondents’ patent application all the steps in the claimed process which it determined were not novel or ‘inventive.’ That is not the purpose of the Section 101 inquiry, and conflicts with the proposition, recited above, that a claimed invention may be entitled to patent protection even though some or all of its elements are not ‘novel.’<sup>103</sup>

The Trilogy Precedents make clear that when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function that the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of Section 101. Under this analysis, the Court did not view Diehr’s claims as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products and so affirmed the judgment of the Court of Customs and Patent Appeals.<sup>104</sup>

At the same time, the Trilogy Precedents seem to be saying that had *Flook* “applied” the calculated alarm setting to “a chemical process at work” or recited “how the alarm setting is used to set off an alarm” or “how adjustments are made to the alarm limit,” the claims in *Flook* might very well have been patentable subject matter. These deficiencies all suggest that the inclusion of structure in the *Flook* claims that would have linked the unpatentable algorithm recited in *Flook* to known structure might have made the claims patentable subject matter.

## Conclusion

The Court has stated that the application of software must not be an “insignificant post solution activity.” The question then becomes what application of software is not “insignificant post solution activity.” Is it enough for software to simply operate on a computer, or is more required of the software for the application to be more than an “insignificant post solution activity”? For diagnostic method patents, is it enough for the claims to recite determining chemical levels by visual inspection and to rely on naturally occurring samples for patentability or is more required for the application not to be an “insignificant post solution activity”? Finally, will the thinking of the Court in *Bilski* be strictly limited to “process” patents or will it spill over to the other categories of patentable subject matter of machine, manufacture, or composition of matter? “[T]o hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection?”<sup>105</sup>

These are but a few of the questions likely to be faced by companies seeking to patent business, software, and medical diagnostic methods in view of the *Bilski* decision. Companies need to revisit their patenting programs to be sure a process claim is tailored narrowly enough to encompass only a particular application of a fundamental principle rather than to pre-empt the principle itself. Part 2 of this article will provide guidelines on how to keep your software and medical diagnostic claims from being construed to be insignificant post solution activity and hence unpatentable subject matter under 35 U.S.C § 101.

1. The Juhasz Law Firm offers legal services that allow companies to better see, understand, and realize the potential strategic value from their IP. For more information on Juhasz Law visit the firm Web site at [www.patenthorizon.com](http://www.patenthorizon.com).
2. In re *Bilski*, No. 08-964, slip op. (S.Ct. Jun. 10, 2010); \_\_\_ U.S. \_\_\_ (2010).
3. *Id.* at 2.
4. *Id.*
5. *Id.* at 3.
6. *Id.*
7. *Id.*
8. *Id.*
9. *Id.* at 4.
10. *Id.*
11. *Id.* at 5.
12. *Id.*
13. *Id.* at 6.
14. *Id.* at 6–7.
15. *Id.* at 8.
16. *Id.* at 9.
17. *Id.* at 10.
18. *Id.*
19. *Id.* at 11.
20. *Id.*
21. *Id.* at 13.
22. *Id.*
23. *Id.* at 16. *Gottschalk v. Benson*, 409 U.S. 63 65 (1972); *Parker v. Flook*, 437 U.S. 584 (1978), and *Diamond v. Diehr*, 450 U.S. 175 (1981).
24. *See, e.g., State Street*, 149 F.3d, at 1373; *AT&T Corp.*, 172 F.3d, at 1357; *id.* at 16.
25. *Bilski* at 1. (Stevens, J., dissenting).
26. *Id.* at 15; *id.* at 47 (Stevens, J., dissenting).
27. *Id.* at 1. In his opinion concurring in the judgment, Justice Breyer agreed with Justice Stevens that “a general method of engaging in business transactions” is not a patentable “process” within the meaning of 35 USC § 101. He nonetheless wrote a concurring opinion in order to highlight the substantial agreement among the Members of the Court on many of the fundamental issues of patent law raised by the case and to provide needed clarity and settled law in this highly technical area *Id.* at 1 (Breyer, concurring).  
 First, Section 101 is broad but not without limit. Second, the machine-or-transformation test has repeatedly helped the Court to determine what is “a patentable process.” Third, the machine-or-transformation test has always been a “useful and important clue,” it has never been the “sole test” for determining patentability. Fourth, “this by no means indicates that anything which produces a “useful, concrete, and tangible result,” is patentable. (referring to *State Street Bank & Tire Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998)). *Id.* at 2–3.
28. *Bilski* at 9.
29. *Id.* at 12.
30. *Id.* at 4 (Breyer, concurring).
31. *Id.* at 16.
32. *Benson* at 65.
33. *Bilski* at 13.
34. *Benson* at 69.
35. *Id.* *Bilski* at 13.
36. *Id.* at 14.
37. *Id.*
38. *Id.*
39. *Id.*
40. *Id.* at 8 (Stevens, J., dissenting).
41. *Id.* at 5.
42. *Benson* at 67, 72; *see also, e.g., Diehr* at 185; *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).
43. *Bilski* at 13.
44. *Bilski*, at 8. (Stevens, J., concurring).
45. *Id.* at 9. (Stevens, J., dissenting).
46. *Id.* at 12.
47. *Id.*
48. *Chakrabarty* at 310, *citing Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948).
49. *Funk Brothers Seed Co.* at 130.
50. *Id.* at 131.
51. *Id.* at 128. The claim read: “An inoculant for leguminous plants comprising a plurality of selected mutually non-inhibitive strains of different species of

- bacteria of the genus *Rhizobium*, said strains being unaffected by each other in respect to their ability to fix nitrogen in the leguminous plant for which they are specific.” *Id.* at footnote 1.
52. *Id.* at 131.
53. *Id.*
54. *Id.* at 130.
55. *See, for example, Funk Brothers Seed Co.*; at 131 *American Wood-Paper Co. v. Fibre Disintegrating Co.*, 90 U.S. (23 Wall.) 566 (1874); *Chakrabarty* at 303. In *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International*, 534 U.S. 124, 134 (2001), a 2001 case involving a plant patent, the US Supreme Court cited *Chakrabarty* for the long-standing notion that under the product of nature doctrine the “relevant distinction” for Section 101 purposes is not “between living and inanimate things, but between products of nature, whether living or not, and human-made inventions,” quoting *Chakrabarty* at 313. This case dealt with the Plant Variety Protection Act, where the product of nature doctrine was revisited in an effort to analyze the original Plant Patent Act of 1930.
56. The *Chakrabarty* court fully distinguished *Funk* by stating that in *Funk* there was merely the discovery of a natural possibility, which was the combination of root bacteria. On the other hand, in the present case, the inventor had “produced a new bacterium with markedly different characteristics from any found in nature.” *Id.* at 310. The Court said that “His discovery is not nature’s handiwork, but his own: accordingly, it is patentable subject matter under § 101.” *Id.* at 310. Thus, the inventor had “intervened at the genetic level to make something that nature had not and, apparently, could not.” John M. Conley and Robert Makowski, “Back to the Future: Rethinking the Product of Nature Doctrine as a Barrier to Biotechnology Patents (Part II),” 85 *J. Pat. & Trademark Off. Soc’y* 371, 375 (2003). *See* discussion of *Chakrabarty* *infra*.
57. “This is not to suggest that § 101 has no limits or that it embraces every discovery. The laws of nature, physical phenomena, and abstract ideas have been held not patentable.” *Chakrabarty* at 309, *citing Parker v. Flook*, 437 U.S. 584 (1978); *Benson* at 67; *Funk* at 130; *O’Reilly v. Morse*, 15 How. 62, 112–121 (1854); *Le Roy v. Tatham*, 14 How. 156, 175 (1853). *Chakrabarty* at 310.
58. *Id.*, at 309, *citing Funk* at 130.
59. An alternate view may be that any *pure* mental process is manifested entirely within the brain and so is a creation of nature and hence is never “new” in the Section 101 sense of the word *per se* (no one is actually making or building anything—it is only going on inside one’s head).
60. U. S. Const., Art. I, § 8, cl. 8.
61. *Id.*
62. *Id.*
63. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966).
64. *Id.* (As the Court recently opined, the infringement context does seem to reduce its importance, especially since it was followed by many Courts, including *Eldred’s*).
65. *Graham* at 234.
66. *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 63 (1998) (emphasis added). *See also, Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996) (“Congress created the Court of Appeals for the Federal Circuit as an exclusive appellate court for patent cases . . . observing that increased uniformity would strengthen the United States patent system in such a way as to foster technological growth and industrial innovation.” (citations and internal quotation marks omitted) (emphasis added)); *Diehr*, 450 U.S. at 188 n.11; *Benson*, 409 U.S. at 67, 71 (refusing to “freeze [the patentability of] process patents to old technologies, leaving no room for the revelations of the new, onrushing technology” (emphases added)).
67. In re *Musgrave*, 431 F.2d 882, 893 (CCPA 1970) (emphasis added).
68. In re *Bilski*, 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008), p. 104.
69. *See supra* n.60
70. *Bilski* at 14.
71. *Id.*
72. *Flook* at 585.
73. *Id.*
74. *Id.*
75. *Id.* at 586.
76. *Id.*
77. *Id.*
78. *Id.*
79. *Id.*
80. *Id.*
81. *Id.* at 594, 595.
82. *Morse* at 416.
83. *Id.* at 432.
84. *Flook* at 600.
85. *Id.* at 587.
86. *Id.*
87. *Id.* at 600.
88. *Bilski* at 14.
89. *Diehr* at footnote 5.

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90. *Id.* at 187.
  91. *Id.* at 191–193.
  92. *Id.* at footnote 14.
  93. *Id.*
  94. *Id.*
  95. *Id.*
  96. *Id.*
  97. *Id.*
  98. *Id.*

99. *Id.* 104
100. *Id.* at footnote 15.
101. *Id.*
102. *Deepsouth Packing Co. v. Laitram Corp.*, 406 U. S. 518 (1972).
103. *Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U. S. 147, 340 U. S. 152 (1950).” *Deepsouth* at 521–522 (footnote omitted).
104. *Id.*
104. *Id.*
105. *Diehr* at 193.

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