

# If *Flook* and *Diehr* are Guidepost, where are we going? When is a process patentable?

BY R. LEE VAIL OF KEAN MILLER LLP

*Lee Vail is an associate in the New Orleans office of Kean Miller LLP. He joined the firm in 2010 and practices in the intellectual property, patent, and corporate litigation groups. He is a Registered Professional Engineer in Louisiana and Wisconsin. Lee is also a registered Patent Attorney and is licensed to practice before the United States Patent and Trademark Office. His patent practice includes the prosecution of patent applications, and patentability research and requirements. Prior to joining Kean Miller, Lee served as Manager of Environmental Affairs for a worldwide oil and gas company. He can be reached at [lee.vail@keanmiller.com](mailto:lee.vail@keanmiller.com)*

*Laboratories, Inc.*, 130 S.Ct. 3543 (2010). The subsequent decision by the United States Court of Appeal – Federal Circuit was appealed and upon return to the Supreme Court, *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S.Ct. 1289 (2012), the Court declared that *Flook* and *Diehr* were “cases most directly on point, both addressed processes using mathematical formulas that, like laws of nature, are not themselves patentable.” 132 S.Ct. at 1292.

*Flook* stood for patent ineligible incorporation of mathematical algorithms, *Diehr* stood for the converse. Both of the last two Supreme Court decisions concerning process patents held that process patent eligibility was to be guided by *Flook* and *Diehr*. Thus, via simple compare and contrast of *Flook* and *Diehr*, it should be possible to establish criteria for patent eligibility.

## PATENTABLE PROCESSES – *FLOOK AND DIEHR*

*Flook* and *Diehr* were decided less than three years apart; both applied mathematical algorithms to chemical processes. The patent issued to Mr. Flook was for a method to reset a process alarm in a chemical manufacturing process based on measured conditions. Mr. Diehr’s patent was for a method of manufacturing rubber and contained a calculation to reset the reaction time based on measured conditions. The Court decided that the method of resetting the process alarm was not patent eligible, while the method relating to the manufacture of rubber was patent eligible. The majority in *Flook* did not see eye to eye with the majority in *Diehr*; the *Flook* authors wrote the dissent in *Diehr* and vice versa. Written from opposite points of view, the two cases together lack continuity.

“While the categories of patent-eligible subject matter recited in § 101 are broad, their scope is limited by three important judicially created exceptions. ‘[L]aws of nature, natural phenomena, and abstract ideas’ are excluded from patent eligibility.” *CLS Bank Int’l v. Alice Corp. Pty. Ltd.*, 717

F.3d 1269, 1276-77 (Fed. Cir. 2013) citing *Diehr* at 181. Tension exists between the broadness of § 101 and the judicially created exceptions; courts to date, have been unable to decide whether the exceptions are to be read narrowly or as they were broadly written in §101. “If carried to its extreme, [the judicial exceptions] make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.” 450 U.S. at 189, FN12. The opinions in *Diehr* and *Flook* are supposed to provide guidance in resolving this tension; unfortunately they don’t.

*Diehr* and *Flook* both applied the knowledge gained through a calculation to new and useful ends; the calculation directed a subsequent helpful activity. *Flook* referred to this action as a post-solution activity.<sup>3</sup> A major finding of *Flook* was that “[t]he notion that post-solution activity, no matter how *conventional or obvious* in itself, can transform an unpatentable principle into a patentable process exalts form over substance.” 437 U.S. at 590 (emphasis added).

The *Flook* majority did not reject patentability of process relying on these judicially excluded concerns *per se*. Inventive application of a law of nature or a mathematical algorithm may be patent eligible. See 437 U.S. at 594. The *Flook* Court recognized the patent eligibility of various machines that rely on formulas and laws of natures: patents for adjustments to paper machines to better take advantage of gravity<sup>4</sup>; a new chemical process based on a known principle<sup>5</sup>; and an improved antenna that used known equations to improve the design.<sup>6</sup> These prior inventions used equations and laws of nature to create better machines (not processes); thus *Flook* does not guide us as to patentability of processes, except that the post-solution activity may not be *conventional or obvious*.

The patent at issue in *Flook* was titled “Method for Updating Alarm Limits.” As described by the Court,

An “alarm limit” is a number. During catalytic conversion processes, operating conditions such as temperature, pressure, and flow rates are constantly monitored. When any of these “process variables” exceeds a predetermined “alarm limit,” an alarm may signal the presence of an abnormal condition indicating either inefficiency or perhaps danger. Fixed alarm limits may be appropriate for a

“**W**hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions of this title.” 35 U.S.C. § 101. Although a simple statement, the courts have failed to develop a consistent criteria or guidepost to interpret this language. In 2008, the Federal Circuit attempted to develop a patent eligibility criterion by establishing the “machine-or-transformation test.”<sup>1</sup> While rejecting this test as a rule, the Supreme Court agreed in *Bilski v. Kappos*, 130 S.Ct. 3218 (2010), “that the machine-or-transformation test [was] a useful and important clue.”<sup>2</sup> The Court said that a process or method patent that did not involve a machine or transformation might nonetheless be patentable, but failed to say when or how. While declining to further define eligible process patents, the Court referred back to the “guideposts” of *Parker v. Flook*, 437 U.S. 584 (1978) and *Diamond v. Diehr*, 450 U.S. 175 (1981). 130 S.Ct. at 3231. Since *Flook* and *Diehr* are guidepost, they must be telling us which way to go.

Concurrent with the decision in *Bilski*, the Court vacated and remanded *Mayo Collaborative Services v. Prometheus*

steady operation, but during transient operating situations, such as start-up, it may be necessary to “update” the alarm limits periodically.<sup>7</sup>

In practice, at the time of *Flook*, after an alarm limit was reached, a unit operator responded to the alarm, at the very least by acknowledging the alarm. If the operator assigned to monitor the alarm decides that action is necessary, they will respond to the alarm by changing some process variable to mitigate undesirable consequences. The information (that an alarm level had been reached), is visually or audible communicated to an individual whose job it is to make control decisions. That individual may decide to make a number of different process adjustments or to do nothing.

The Supreme Court rejected *Flook*’s method claim; “respondent’s application simply provides a new and presumably better method for calculating alarm limit values.” 437 U.S. at 594. Inventive application of a law of nature or a mathematical formula may support a patent, but there must be “some other inventive concept in its application.” *Id.* Less than three years later, a different majority would distinguish *Diehr* from *Flook* by declaring that the post-solution activity of *Flook* was insignificant. “Inventive concept” was mandatory under *Flook*, the only mention of the term in *Diehr* was in the dissent.

The similarities between *Flook* and *Diehr* are striking, especially from the view of *Diehr*’s dissenting Justices. From the majority’s viewpoint, *Diehr* patented a method of producing rubber (i.e., transforming matter) that used a repetitive calculation to determine the proper cure time. The claims of *Diehr* included steps of gathering temperature data for insertion into a formula that calculates the time required for the rubber to cure. As soon as the time required matches the time that the rubber actually cured, a signal is sent to open the press. 450 U.S. at 177; also see FN 5. The minority however saw little difference in the two patents.

In its effort to distinguish *Flook* from the instant case, the Court characterizes that postsolution activity as “insignificant,” *ante*, at 1059, or as merely “token” activity, *ante*, at 1059, n. 14. As a practical matter however, the postsolution activity described in the *Flook* application was no less significant than the automatic opening of the curing mold

involved in this case. 450 U.S. at 215.

Jumping forward to *Mayo*, the Court stated that the inventor’s claim for patentability “is weaker than *Diehr*’s patent-eligible claim and no stronger than *Flook*’s unpatentable one.” 132 S.Ct. at 1292. Since *Diehr*, the Court has maintained the distinction over and over; *Diehr*’s post-solution activity was significant, whereas *Flook*’s was not.<sup>8</sup> In *Mayo*, the Court invalidated the patent through the use of a judicially created exclusion by ruling that the process was based on a law of nature. Although it was proposed that the *Mayo* claims contained other non-law of nature elements such as administering drugs and measuring the results, the court was unpersuaded, holding:

[these] step[s] tells doctors to engage in well-understood, routine, conventional activity previously engaged in by scientists who work in the field. Purely “conventional or obvious” “[pre]-solution activity” is normally not sufficient to transform an unpatentable law of nature into a patent-eligible application of such a law. 132 S.Ct. at 1298.

Thus the Court in *Mayo* returned to *Flook*; processes that rely on judicially excluded concepts and otherwise contain *conventional and obvious* steps are not patentable. *Mayo*’s patentability “was no stronger than *Flook*’s.” 132 S.Ct. at 1292. This is consistent with *Flook* as the alarm provided information; implicit is that the operator should consider the alarm when making operational decisions. Similarly, the final step in the *Mayo* patent, “simply tell[s] a doctor that they should consider the test results when making their treatment decision.” 132 S.Ct. at 1291. In the end, both patents provided information to allow a trained person to make a better decision. Both were not patent eligible subject matter.

## FEDERAL CIRCUIT IN VIEW OF BILSKI AND MAYO

On May 10, 2013, the Federal Circuit, sitting *en banc*, handed down its opinion in *CLS Bank Int’l v. Alice Corp.* The majority of the Federal Circuit judges agreed on little other than that the method and computer-readable medium claims involved in the dispute were patent ineligible. Essentially, Alice Corporation owned patents that the Federal Circuit found to be nothing more

than abstract ideas based on use of escrow accounts and record keeping associated with the settling of transactions. However, the Court failed to agree on the reasoning as to why such claims were ineligible subject matter with the judges evenly split regarding the eligibility of comparable computer systems claims.

The panel of ten Federal Circuit Justices was so fractured in their reasoning that the “decision” constitutes six separate opinions. In the most basic sense, the Judges agreed that prior Supreme Court precedent require that patent claims containing abstract ideas must have meaningful limitations. However, a group of five Judges (Lourie, Dyk, Prost, Reyna, and Wallach) rejected patent eligibility of the computer system claims, concluding that incorporation of the method into a computer program was an insufficient limitation. This opinion begins with a statement consistent with *Flook* and *Mayo*; “Limitations that represent a human contribution but are merely tangential, routine, well-understood, or *conventional*, or in practice fail to narrow the claim relative to the fundamental principle therein, cannot confer patent eligibility.” 717 F.3d at 1269. *CLS Bank* is consistent with *Flook* and *Mayo*: all emphasize non-patentability of convention human activity.

*CLS Bank* extrapolates on prior opinions noting that computers “have routinely been adapted by software consisting of abstract ideas, and claimed as such, to do all sort of task that formally were done by humans.” 717 F.3d at 1291. This implication seems to contradict long standing caselaw which has held that new computer software indeed creates a new computer. *In re Alappat*, 33 F.3d 1526 (Fed. Cir 1994). The opinion of the five Judges strongly denote their belief that recent Supreme Court decisions may have overturned *Alappat* and, in light of the possible overruling of *Allapat*, that the incorporation of a computer program into a computer, relying on an abstract idea, is not patent eligible. A second group of four Judges concluded that the “system claims are indistinguishable from those in *Diehr*.” 717 F.3d at 1311.

Although the system claims (containing a computer) are similar to *Diehr*, they are distinguishable. The final step of the *Diehr* claim results in a signal routed to a machine which performs a manufacturing function; the *Diehr* invention controls a machine. The final step of *CLS Bank*’s system claim generates an instruction to an exchange institution to reconcile the party’s

accounts. Signals that operate a machine may be distinguishable from signals that give instructions to bookkeepers.

In another recent case, *Ass'n for Molecular Pathology v. U.S. Patent & Trademark Office*, 689 F.3d 1303 (Fed. Cir. 2012), the Federal Circuit allowed one method claim while rejecting five related, but distinguishable method claims. Although the Supreme Court rendered a further decision in the case it did not involve the allowed method claim allowing an opportunity to examine rejected and allowed patent claims, side by side.

Myriad Genetics, Inc., was the holder of multiple patents concerning the isolation of deoxyribonucleic acid (DNA) sequences associated with predisposition to breast and ovarian cancers. These patents also contained method claims for determining alterations or mutations in individual samples. Five method claims were rejected; the Federal Circuit found them indistinguishable from Prometheus' claims in *Mayo*. Id. at 1335. The rejected claims typically comprised steps that included screening, comparing, and analyzing. Conversely, the Federal Circuit allowed claim 20 of U.S. Patent 5,747,282 (the "282" patent), a claim "directed to a method for screening potential cancer therapeutics via changes in cell growth rates of transformed cells." Id. Steps within the claim included growing host cells, transformed with an altered gene, in the presence of a potential cancer therapeutic, and comparing the growth rates to similarly transformed cells that were not exposed to the potential drug (i.e., a control). Id. at 1336.

*Mayo* taught, consistent with *Flook*, method claims must do more than state an abstract idea or a law of nature and then add the words "apply it." 132 S.Ct. at 1294. The Federal Circuit held in this case:

Here, claim 20 does do more; it does not simply apply a law of nature. Of course, all activity, whether chemical, biological, or physical, relies on natural laws. But, more to the point here is that claim 20 applies **certain steps to transformed cells** that, as has been pointed out above, are a **product of man**, not of nature. The Court, in its evaluation of the *Mayo* method claims, found that the additional steps of those claims were not sufficient to "transform" the nature of the claims from mere expression of natural laws to patent-eligible subject

matter. By definition, however, **performing operations, even known types of steps, on, or to create, novel, i.e., transformed subject matter is the stuff of which most process or method inventions consists.** 689 F.3d at 1336.

The five disallowed method claims were too similar to Prometheus' claims in *Mayo* to survive. The five disallowed claims are consistent with the findings in *Flook*, as the method only gathered information that required a subsequent human intervention. Conversely, Claim 20 contained information gathering steps that depended on materials that was made or transformed by humans. *Diehr* required the gathering of information to create a man made material, rubber. In this sense, although not stated as such, the guidepost of *Flook* and *Diehr* appear to have guided the way. Furthermore, by allowing Claim 20 from "282" patent, the Federal Circuit has tacitly reaffirmed their machine-or-transformation test.

### **FLOOK V. DIEHR**

Considering the *Diehr* patent and the *Flook* patent as a whole, it is obvious that only a single difference exists between the two methods; *Flook* returned the calculated number to a human requiring human attention whereas the *Diehr* patent returned the calculated information to a machine as operating instructions. The result of the *Diehr* patent was a process that proceeded to a predictable result. The result of the *Flook* patent was to suggest to an operator that he needed to think about what happens next and the result is dependent on his judgment and actions.

Considering *Diehr*, had *Flook* sent the alarm signal to a processor (such as a modern distributive control system with regulatory capability) with process operating instructions to address the alarm, it would likely have been patentable. This hypothetical modification of *Flook* suggests a narrower test; a mathematical algorithm output in a patent claim must be a control input to a machine or transformation of matter. The Court, in effect, tells us that the "machines or transformation" criteria was a "symptom" of patentability but not the "cause." Machines (such as computers that calculate algorithms) produce consistent, reproducible results. Perhaps a viable substitute for "machine or transformation," or at least another clue to be used in determin-

ing patentable subject matter for process patents, is "reproducibility of results."

### **REPRODUCIBILITY OF RESULTS**

Patent law embodies a process for allowing the inventor to benefit for a period of years from his innovation for the price of fully disclosing to the public the extent of his discovery.<sup>9</sup> Disclosures must comply with the enablement requirement contained in the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Scientific inquiry within the scientific community proceeds along a similar path. After the scientist has formulated and tested his hypotheses, he publishes his results, with sufficient methodological information so that others in the scientific community can attempt to replicate the experiments. Publication of a patent application (or issued patent) or of a technical paper starts a chain of activities where others attempt to reproduce the experiments or method to find out if the "enabled" methodology results in repeatable or concrete results. "The process must have a result that can be substantially repeatable or the process must substantially produce the same result again." MPEP 2106.IV.C.2(2)(c).

As with *Flook* before it, *Mayo* required that the output from a law of nature<sup>10</sup> be placed in human hands with the "suggestion that [the doctor] should take those laws into account when treating his patients." 132 S.Ct. at 1297. In applying the *Flook* process, the operator receives a number and takes action consistent with his knowledge of natural laws controlling the catalytic process. In *Mayo*, the doctor receives a number and takes action consistent with his knowledge. *Flook*, *Bilski* and *Mayo* have one thing in common that distinguishes them from *Diehr*. They relied on human intervention, i.e., mental steps, which by their very nature result in inconsistent results. Many decisions by the Federal Circuit also follow this pattern, repeatable processes are found to be patentable.<sup>11</sup> Other repeatable processes utilizing a computer have

been rejected for an independent concept; “use of the machine must impose meaningful limits on the claim’s scope.”<sup>12</sup> The machine (computer) “must play a significant part in permitting the claimed method to be performed.”<sup>13</sup> Considered together, algorithms produce concrete reproducible results; algorithms can be solved by computers; processes utilizing algorithms may be patentable if the process would fail without use of the algorithms, and of course the invention is novel and nonobvious. But considering one of the opinion in *CLS Bank*, at what point does reproducible become conventional and obvious?

If requiring reproducible results, are we potentially muddling the analysis? An enabling disclosure is needed to comply with the first Paragraph of 35 U.S.C. Section 112. Section 112 establishes that the specification shall describe the invention sufficiently to enable a person skilled in that art to make and use the invention. But what if the invention is fully described but fails to produce consistent results? Is this not a different question? Perhaps what is missing from many patents rejected as non-patent eligible is a lack of repeatable or verifiable results that should result in a §112 rejection.

## INVENTIVE CONCEPT

*Bilski* did not add to our understanding concerning the characteristics of a patent eligible process. In *Mayo*, the Court returned to the requirement that “a process that focuses upon use of a natural law also contain other elements or combination of elements” have an “inventive concept.”<sup>14</sup> 132 S.Ct. at 1294. The Court rejected the patent in *Flook* because it lacked an inventive concept. 98 S.Ct. at 2528. Was there an inventive concept in *Diehr*? The majority of the Court fails to consider the question and instead focuses on the use of a well known equation in a process as a whole, for the “transformation or reducing an article to a different state or thing.” 450 U.S. at 192. The *Diehr* minority would have

applied the rule established in *Flook* and would have invalidated the patent since it lacked an inventive concept.<sup>15</sup> Is it possible for *Diehr* to stand as precedent and require that a process patent have an inventive concept?

## CONCLUSION

Methods that calculate new information from gathered information may be patentable subject matter where that new information is used to operate a machine or transform matter. Methods that use information, gathered from man-made materials, may also be patentable material. *Diehr* and *Flook* can be reconciled by accepting that new information, calculated from gathered information must be used to operate a machine or transform matter. In addition to the machine-or-transformation clue, reproducibility of the core objective of the patent could be another useful clue. Reconciling *Diehr* with the inventive concept requirement can only be accomplished by narrowing *Diehr* to the specific case.<sup>16</sup> A careful review of the Syllabus section of the *Diehr* decision reveals that the Court was focused on a process “performed upon the subject-matter to be transformed and reduced to a different state or thing.”<sup>17</sup> Perhaps the Court, knowingly or not, has reserved *Diehr* to cases involving transformation of matter. If such, the Court should restrain itself from using *Diehr* as a guidepost for patentability of non-transformation of matter cases. Narrowing the reach of *Diehr* may result in simpler development of a separate rule to address non-transformation-of-matter process patents. **IP**

## ENDNOTES

1. In re *Bilski*, 545 F.3d 943, 957 (Fed. Cir. 2008).
2. *Bilski v. Kappos*, 130 S. Ct. 3218, 3227 (2010).
3. Prior to review by the Supreme Court, the United States Court of Customs and Patent Appeals coined the term “post-solution activity” in the Application of Dale R. Flook, 559 F.2d 21 (C.C.P.A. 1977) to distinguish the case from the Application of Dean M. Christensen, 478 F.2d

1392 (C.C.P.A. 1973) which held that a method claim could not have a mathematical equation as the final step.

4. *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45 (1923).
5. *Tilghman v. Proctor*, 102 U.S. 707 (1880).
6. 306 U.S. 86.
7. 437 U.S. at 585.
8. For example, In re *Bilski*, 545 F.3d 943, 957 (Fed. Cir. 2008); *Bilski v. Kappos*, 130 S. Ct. 3218, 3230 (U.S. 2010); *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289, 1294 (2012); *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057, 1067 (Fed. Cir. 2011); *Fort Properties, Inc. v. Am. Master Lease LLC*, 671 F.3d 1317, 1321 (Fed. Cir. 2012).
9. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989).
10. Calculated by *Flook* and chemically analyzed by *Prometheus*.
11. See *State Street Bank & Trust v. Signature Financial Group*, 149 F.3d 1368 (Fed Cir. 1998), (patent eligible process was for calculating a share price would result in a repeatable result); In re *Comisky*, 554 F.3d 967 (Fed. Cir. 2009) (patent ineligible process for mandatory arbitration resolution regarding unilateral and contractual documents; arbitration by its very nature is not reproducible); See *CLS Bank Int’l v. Alice Corp. Pty.*, 2012 WL 2708400 (Fed. Cir. 2012) (patent eligible process for exchanging obligations through third party results in consistent outcomes).
12. See *Fort Properties, Inc. v. American Master Lease*, 671 F.3d 1317, 1323 (Fed. Cir. 2012) citing *Cyber Source Corp. v. Retail Decisions, Inc.* 654 F.3d 1366 (Fed. Cir. 2011), quoting In re *Bilski* 545 F.3d at 961.
13. *SiRF Tech., Inc. v. Int’l Trade Comm’n*, 601 F.3d 1319, 1333 (Fed. Cir. 2010).
14. But consider *CLS Bank Int’l* at \*14 (minority chastises the majority for failure to include an inventive concept analysis as required by *Mayo v. Prometheus*).
15. The patent application filed by *Diehr* and *Lutton*, however, teaches nothing about the chemistry of the synthetic rubber-curing process, nothing about the raw materials to be used in curing synthetic rubber, nothing about the equipment to be used in the process, and nothing about the significance or effect of any process variable such as temperature, curing time, particular compositions of material, or mold configurations. In short, *Diehr* and *Lutton* do not claim to have discovered anything new about the process for curing synthetic rubber. See 450 U.S. at 205-06.
16. Alternatively, the Court could articulate the inventive concept found in *Diehr*, potentially leading to clarity and continuity in the cases and related rules.
17. 450 U.S. at 175-76.