

BUSINESS METHOD PATENTS: ARE THERE ANY LIMITS?

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I. INTRODUCTION

More than one hundred years ago, on June 20, 1893, John T. Hicks was awarded U.S. Patent Number 500,071, entitled “Method of and Means for Cash Registering and Account Checking.” The patent described a method of preventing theft committed by restaurant waiters. Although it was later declared invalid by a court for lack of “patentability,”¹ the Hicks patent was one of the earliest examples of a business method patent – that is, a patent that protects a method of doing business.

Many such patents were issued over the ensuing decades. Nevertheless, the public and the patent bar were somewhat surprised when in 1998 the Federal Circuit declared that business methods could be patented. That court’s decision in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*² seemed to usher in a new era of patenting methods of conducting commercial transactions, such as those conducted over the Internet. Its 1999 decision in *AT&T Corp. v. Excel Communications, Inc.*³ broadened the contours of *State Street Bank*, apparently doing away with the requirement that a method claim must involve any sort of physical transformation in order to render it patentable and focusing instead on the “useful, concrete and tangible result” aspect of the test.⁴

Consider the subject matter of recently-issued U.S. Patent No. 6,329,919 (issued Dec. 11, 2001), entitled “System and Method For Providing Reservations for Restroom Use.” This patent, owned by IBM, contains the following claim:

1. A method of providing reservations for restroom use, comprising:
receiving a reservation request from a user; and
notifying the user when the restroom is available for his or her use.⁵

Following a PTO-ordered reexamination of this patent prompted in part by public derision,⁶ IBM recently disclaimed this patent.⁷

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¹ *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467 (2d Cir. 1908). Although cited by the patent office and commentators over the years as authority for the proposition that “business methods” are not patentable, the Federal Circuit in *State Street Bank* properly held that any such suggestions in that early decision were dictum.

² 149 F.3d 1368 (Fed. Cir. 1998).

³ 172 F.3d 1352 (Fed. Cir. 1999).

⁴ *Id.* at 1358-59.

⁵ U.S. Patent No. 6,329,919 (issued Dec. 11, 2001).

⁶ *IBM’s Crappiest Crapping Patent* PATNEWS, January 4, 2002 (on file with the author); see *Request for Reexamination*, OFFICIAL GAZETTE, April 2, 2002, available at

Assuming that the IBM patent can be considered a business method – the specification describes the method as being useful for reserving restrooms aboard commercial airplanes – one may wonder whether patents of this sort protect the “useful arts” contemplated by the framers of the Constitution, and whether such a patent would meet the *State Street Bank/AT&T* test for patentability.

The outer boundaries of the *State Street Bank* holding are unclear. Although the Federal Circuit did not declare that all business methods were necessarily patentable, the court stated that “the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application . . . because it produces a useful, concrete and tangible result – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.”⁸ This, the court said, was all that was needed to pass muster under section 101 of the patent statute.⁹

The “useful, concrete and tangible result” standard announced in *State Street Bank* renders it difficult to determine whether a particular patent claim recites statutory subject matter. The requirement that the claimed subject matter be “useful” imposes few hurdles to patentability, except perhaps in cases of inoperable devices such as perpetual-motion machines and truly meritless inventions, such as a method of clogging a sink. The requirements of “concreteness” and “tangibility” likewise serve as relatively poor indicia of patentability. The dictionary definitions of “concrete” and “tangible” are very similar, providing few clues as to what might fall on one side of the line or the other.¹⁰

Applying the *State Street Bank/AT&T* formulation to a given set of facts can be tricky. Consider, for example, a method of interviewing a job candidate that allows the interview to be conducted more efficiently. The claimed steps of this hypothetical method, which is assumed to be novel and not obvious, are set forth below:

1. A method of interviewing a job candidate, comprising the steps of:
 - (1) obtaining from the job candidate only basic biographical information (name, address, telephone number, and social security number);
 - (2) comparing the basic biographical information to a database of citizen information maintained by a governmental entity;
 - (3) if the comparison yields no match, terminating the interview; and

<http://www.uspto.gov/web/offices/com/sol/og/2002/week14/patrequ.htm> (last visited October 10, 2002) (showing Commissioner order reexamination C.N. 90/006,176, ordered February 12, 2002).

⁷ *Disclaimer*, OFFICIAL GAZETTE, April 2, 2002, available at <http://www.uspto.gov/web/offices/com/sol/og/2002/week14/patdisc.htm> (last visited October 10, 2002).

⁸ *State St. Bank*, 149 F.3d at 1373.

⁹ The court also concluded that the claimed invention did not constitute a mathematical algorithm, thus avoiding another bar to patentability.

¹⁰ The American Heritage Dictionary (1981 ed.) defines the word “concrete” as “relating to an actual, specific thing or instance; not general; particular . . . existing in reality or in real experience; perceptible by the senses; real.” The same dictionary defines the word “tangible” as “discernable by the touch; capable of being touched; palpable . . . visible and appraisable; corporeal.” *Id.* It is unclear how a share price (*i.e.*, a number) is “palpable.”

(4) If the comparison yields a match, conducting a full interview with the job candidate.

Suppose that the specification of this hypothetical patent discloses a scientific study demonstrating that approximately 10% of job applicants use fraudulent biographical information (*e.g.*, a bogus social security number) and that conducting extensive interviews for such applicants wastes valuable time of the employer. Consequently, the inventors propose a scheme by which basic biographical information is elicited and verified before continuing with a full interview, as outlined in the hypothetical claim above. Based on actual test results conducted across many different employers, the specification asserts that the invention produces a 25% reduction in labor costs associated with interviewing candidates who otherwise would be terminated or rejected later in the process. This increase in efficiency is well documented and produces a “practical” effect, *i.e.*, an increase in efficiency of the corporation.

Should this method be patentable merely because it produces a “useful, concrete, and tangible result?” Does this method meet the definition of a “process” that falls within the scope of 35 U.S.C. § 101? Given that no physical transformation is necessary to meet the statutory requirement for utility, and given that the claimed invention produces useful and arguably “concrete” results, the claim would seem to be patentable.

Although the Federal Circuit has yet to strike down a business method patent for failing to meet the criteria set forth in 35 U.S.C. § 101, there are thousands of patents that may test the limits of the *State Street Bank/AT&T* doctrine if ever presented to the court. Consider, for example, the claims of the following issued U.S. patents:

U.S. Patent No. 6,347,942 (issued Feb. 19, 2002) entitled “Early Involvement Method for Preparing Elementary School Students for Secondary School”. The only independent claim of this patent appears to cover a method of preparing students for high school by enrolling them in an early involvement program and granting school credits to those who successfully complete the program.

U.S. Patent No. 5,851,117 (issued Dec. 22, 1998) entitled “Building Block Training Systems and Training Methods”. The only independent claim of this patent appears to cover a method of teaching a janitor how to clean a building by providing him with specially prepared training materials.

U.S. Patent No. 6,257,248 (issued July 10, 2001) entitled “Both Hand Hair Cutting Method”. The only independent claim of this patent appears to cover a method of cutting hair using both hands. The specification explains that the invention is intended for use by hairdressers.

U.S. Patent No. 6,049,811 (issued April 11, 2000) entitled “Machine for Drafting a Patent Application and Process for Doing Same”. Independent claim 10 of this patent appears to cover a method of drafting a patent application by preparing various sections of the application in a particular order.

U.S. Patent No. 6,449,600 (issued Sep. 10, 2002) entitled “System, Method and Computer Program Product for Airport Equipment Information

and Exchange”. Claim 1 of this patent appears to cover a method for sharing equipment at an airport.

U.S. Patent No. 5,930,769 (issued July 27, 1999) entitled “System and Method for Fashion Shopping”. Claim 1 of this patent appears to cover a method for shopping for garments based on body type.

Aside from lack of novelty or obviousness, are there no limits on the type of patents that can be validly granted? What about a method of thinking, or a method of running a new football formation? Or what about patenting an argument? A former PTO Director was quoted during an interview as saying that as long as an argument was novel and non-obvious, he would “not have a problem with [patenting] it at all.”¹¹

This article proposes that the proper inquiry for determining whether a method claim meets the definition of a “process” under section 101 of the patent statute is to ask whether (1) the method as disclosed in the patent has a practical utility; and (2) the method steps as claimed recite some transformation of matter. Without satisfying both of those independent conditions, the claim would not be statutory. Nevertheless, under a liberal reading of “transformation,” any method having a practical utility and reciting steps executed in a computer would meet this definition because executing instructions in the computer changes the state of the computer. Even a claim to a series of pure mathematical steps – such as the well-known relation $e=mc^2$ – if recited as steps executed in a computer, would constitute patentable subject matter, assuming there is a disclosed utility for the algorithm (*e.g.*, modeling nuclear bombs). Claims to methods involving such activities as teaching or sports, however, would fail this test because they lack any transformation of matter, even though they may have practical utility.

This two-part test is derived from three different sources: (1) the phrase “useful arts” in the U.S. Constitution; (2) the word “process” in the U.S. patent statute; and (3) Supreme Court precedent. The two-part test also renders explicit what was arguably implicit in the *State Street Bank* opinion – a first requirement that the claimed invention have a practical utility, expressed as a “useful, concrete and tangible result,” and a second requirement that the claimed invention recite a transformation of physical subject matter. This test also dispenses with the need for the so-called “mathematical algorithm exception” and the “mental steps” doctrine, since any claim that fails to recite a transformation of matter will by definition fail both of the latter exceptions to patentability.

The proposed test is narrower than the test set forth by the Federal Circuit in *AT&T Corp.*, but the outcome of that case would nevertheless be the same under this proposed test because the claim at issue in *AT&T Corp.* recited sufficient computer-implemented transformation to meet the transformation requirement. Statements in *AT&T Corp.* to the effect that no transformation of matter is required can be read to conflict with earlier Supreme Court and Federal Circuit cases.

This article also proposes that, for apparatus claims, the proper inquiry under section 101 of the statute is to ask whether the claimed apparatus has a disclosed practical utility and recites structure. No separate transformation of

¹¹ Interview between Stephen Pizzo and Q. Todd Dickson, THE O'REILLY NETWORK, May 24, 2000, at <http://www.oreillynet.com/lpt/a/222> (last visited Oct. 12, 2002).

matter is required for an apparatus claim. Under this test, a machine programmed with a mathematical algorithm or business method would automatically qualify as statutory subject matter, even though the algorithm or business method by itself might not be statutory. This flows naturally from the Federal Circuit's holding in *In re Alappat*¹², but it dispenses with the confusing vestiges of case law suggesting that further inquiry is required to determine whether some other nonstatutory subject matter was implicitly being claimed. Under the proposed approach, the form in which the claim is cast – i.e., method or apparatus – determines whether a physical transformation must be recited in the claim.

II. WHAT IS A “BUSINESS METHOD?”

Given that the Federal Circuit has declared that there is no business method exception to patentability,¹³ one might wonder whether there remains any useful purpose in classifying an invention as a “business method.” There are several reasons that this classification retains validity, although the label defies easy definition.

First, Congress in 1999 enacted a new “prior user rights” defense to patent infringement that is available only for inventions that are considered to be a “method of doing or conducting business.”¹⁴ Congressional failure to define what qualifies as a business method will undoubtedly lead to litigation for years to come.¹⁵

Second, the patent office gives special scrutiny to patent applications that are classified into Class 705 – its proxy for computer-implemented business methods.¹⁶ The PTO's reason for treating these applications with special regard stems in part from public outcry over Internet-related patents that purportedly covered obvious variations of known technology. The allowance rate for patent applications falling in Class 705 has been substantially lower than that for patent applications in other classes.¹⁷

Third, Europe and certain other countries take a dim view of business method inventions and may reject patent applications covering such inventions, and

¹² 33 F.3d 1526 (Fed. Cir. 1994)(en banc).

¹³ *State St. Bank*, 149 F.3d at 1375.

¹⁴ 35 U.S.C. § 273(a) (1994 & Supp. 1999).

¹⁵ As of the date of this paper, no court decisions applying this new defense have been reported.

¹⁶ See *Business Methods White Paper*, UNITED STATES PATENT AND TRADEMARK OFFICE, at <http://www.uspto.gov/web/menu/pbmethod> (last visited Oct. 12, 2002). The PTO announced a new quality initiative for patents in Class 705, explaining that “[a] new second-level review of all allowed applications in Class 705 is required to ensure compliance with the mandatory search requirements, clarity and completeness of reasons for allowance, and to determine whether the scope of the claims should be reconsidered.” *Id.*; see also, John Love, *Day 6: Business Perspectives on Patents: Software and the Internet: Diverse Perspectives on Patents*, available at <http://www.ftc.gov/opp/intellect/020227johnlove.pdf> (last visited Oct. 12, 2002) (briefing by John J. Love, Group Director Technology Center 2100).

¹⁷ See Love, *supra* at note 16, at <http://www.ftc.gov/opp/intellect/020227johnlove.pdf>. (citing allowance rate of 45% for Class 705 applications versus 69% for other classes during fiscal year 2001).

may refuse to examine them.¹⁸ This means that U.S. inventors may be limited to obtaining only a U.S. patent, making it difficult to pursue infringers in foreign countries.

Fourth, legislation introduced in Congress in 2001 proposes to severely curtail the scope and enforceability of patents that are considered “business methods.”¹⁹

Fifth, companies that obtain business method patents may be subjected to bad publicity.²⁰

Although not predicated on being classified as “business methods,” methods of performing surgery have also been singled out for special treatment. Congress in 1996 amended the patent statute to preclude enforcement of such patents.²¹

As set forth above, the PTO gives extra scrutiny to computer-implemented business methods. Yet the PTO’s treatment of computer-implemented business practices has arguably not been entirely uniform. Inventions that seemingly belong in the same class 705 category – and that would otherwise be subject to the extra level of scrutiny in that class – are sometimes treated differently. For example, U.S. Patent No. 5,909,668 (issued June 1, 1999), entitled “Banquet Hall Reservation Management System,” describes and claims a computer-implemented system that allows banquet halls to be reserved in an orderly manner. The patent, which is classified in class 705, was issued in 1999. Yet U.S. Patent No. 5,978,463 (issued Nov. 2, 1999), entitled “Reservation Scheduling System for Audio Conferencing Resources” was issued the same year but was not classified in class 705. It is not clear why reserving banquet halls is considered a business method but reserving audio resources is not.

Similarly, U.S. Patent No. 5,842,180 (issued Nov. 24, 1998), entitled “Method and System for Detecting and Correcting Errors in a Spreadsheet Formula,” was classified in class 705 and presumably was subjected to extra scrutiny by the PTO. Yet U.S. Patent No. 6,138,130 (issued Oct. 24, 2000), entitled “System and Method for Processing Data in an Electronic Spreadsheet in Accordance With a Data Type,” was not classified in class 705. Again, it is unclear why one method of manipulating

¹⁸ European Patent Convention Article 52(2)(C), excludes schemes, rules, and methods for performing mental acts, playing games or doing business, and programs for computers. The Canadian patent office similarly proscribes patents on methods of doing business, methods of accounting or statistics, personality or IQ tests and the like. *Examples of Non-Statutory Subject Matter*, Section 16.04, available at http://strategis.ic.gc.ca/sc_mrksv/cipo/patents/mopop/ch16-e.pdf (last visited Oct. 14, 2002).

¹⁹ The “Business Method Improvement Act of 2001” proposes a sweeping definition of business method that would apparently cover such devices as cash registers, enterprise management software, and computers that run the New York Stock Exchange. H.R. 1332, 107th Cong. (2001). The Act would force publication of business method patent applications; create new opposition procedures for such patents; lower the burden of proof for invalidating such patents; and render such patents “presumed obvious” in certain cases. *Id.*

²⁰ One example includes Amazon.com, which has received widespread criticism for its so-called “one-click” patent. See Jesse Berst, *How Patent Attorneys Are Stealing Our Future*, ZDNET, (Jan. 18, 2000), at http://www.zdnet.com/anchordesk/story/story_index_20000118.html (last visited Oct. 10, 2002). For a collection of bad press concerning business method patents, see generally Gregory Aharonian, *Critiques*, at <http://www.bustpatents.com/software.htm> (last visited Oct. 10, 2002).

²¹ 35 U.S.C. § 287(c) (1994 & Supp. 1999).

data in a spreadsheet is considered to be a “business practice” but another method is not.

Finally, U.S. Patent No. 6,098,053 (issued Aug. 1, 2000), entitled “System and Method for Performing an Electronic Financial Transaction,” was classified in class 705. Yet U.S. Patent No. 6,097,834 (issued Aug. 1, 2000), entitled “Financial Transaction Processing Systems and Methods,” was issued on the same day and was not classified in class 705. There are numerous other examples of seemingly similar computer-implemented inventions that were subjected to different treatment by the PTO.

The above examples are not intended as a criticism of the PTO. They merely reinforce the point that it is difficult to decide what falls on one side of the line as opposed to the other. Obviously, line-drawing creates hard cases. It is not known whether a court would attach any significance to the PTO’s classification of a patent when determining whether a patent was subject to the defense under 35 U.S.C. § 273, which applies only to business method patents.

Congressional attempts at defining business method inventions are similarly problematic. For example, the “Business Method Patent Improvement Act of 2001,”²² proposes to amend title 35 to define the terms business method and “business method invention” as follows:

- (f) The term business method means —
 - (1) a method—
 - (A) of—
 - (i) processing data; or
 - (ii) performing calculation operations; and
 - (B) which is uniquely designed for or utilized in the practice, administration, or management of an enterprise;
 - (2) any technique used in athletics, instruction, or personal skills; and
 - (3) any computer-assisted implementation of a method described in paragraph (1) or a technique described in paragraph (2).

- (g) The term “business method invention” means—
 - (1) any invention which is a business method (including any software or other apparatus); and
 - (2) any invention which is comprised of any claim that is a business method.²³

Examples of inventions that would apparently fit the bill include cash registers and bar code scanners; instant replay camera systems at sports events; accounting software and other management tools (e.g., computerized timekeeping software); and all software that runs the New York Stock exchange. Note that the proposed statute expressly equates business “apparatus” with business “methods.”

The proposed bill would require that business method inventions be published at 18 months; institute special opposition procedures for business method inventions; lower the burden of proof for invalidating business method patents; make

²² H.R. 1332, 107th Cong.

²³ H.R. 1332, 107th Cong. § 2.

it easier to prove that a business method invention was obvious; and force patent applicants to disclose whether they performed a prior art search if the invention was classified as a business method.²⁴

Aside from certain practical effects of having a patent characterized as a business method as described above, there is apparently no longer any legal reason for treating such patents differently for purposes of evaluating whether claims appearing in such patents are valid. Nevertheless, as discussed below, patents directed to business-related inventions may run into other patent law doctrines that limit the scope of patentability.

III. THE NAME OF THE GAME IS THE CLAIM

The patent statute extends protection to four different categories of potentially patentable subject matter, including “any new and useful process, machine, manufacture, or composition of matter.”²⁵ Evaluating a given claim to determine whether it recites statutory subject matter is tricky enough without blurring the distinctions among these different categories.

As explained by the late Judge Giles Rich of the Federal Circuit, “the name of the game is the claim.” *In re Hiniker Co.*, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998) (Clevenger, J., quoting prior comments by Judge Rich). Some court decisions, including the *State Street Bank* decision, appear to gloss over the form in which a claim is cast when determining whether the claim recites statutory subject matter. In other words, even if a claim recites an apparatus, the court will look behind the drafting of the claim to determine whether the subject matter is an unpatentable algorithm or other nonstatutory invention.²⁶ Indeed, the Supreme Court has condemned a literal reading of patent claims as depending too much on a draftsman’s art rather than looking at the policy behind patent laws.²⁷

The *State Street Bank* decision exemplifies this mode of analysis. The court stated that, “[t]he question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to . . . but rather on the essential characteristics of the subject matter, in particular, its practical utility.”²⁸ Footnote 13 of the decision further states that, “[a]ny historical distinctions between a method of ‘doing’ business and the means of carrying it out blur in the complexity of modern business systems.”²⁹ The *AT&T* court similarly stated that, “we consider the scope of § 101 to be the same regardless of the form – machine or process – in which a particular claim is drafted.”³⁰ Earlier Court of Customs and Patent Appeals (CCPA) cases had similarly ignored differences between process claims and apparatus claims for the purposes of evaluating

²⁴ H.R. 1332, 107th Cong.

²⁵ 35 U.S.C. § 101 (1994).

²⁶ *Alappat*, 33 F.3d at 1542 (acknowledging precedent stating that claims could be rejected as nonstatutory “mathematical algorithm” even if drafted as an apparatus); *see also*, *In re Freeman*, 573 F.2d 1237, 1247 (C.C.P.A. 1978).

²⁷ *Parker v. Flook*, 437 U.S. 584, 593 (1978).

²⁸ *State St. Bank*, 149 F.3d at 1375.

²⁹ *Id.* at 1376 n.13.

³⁰ *AT&T Corp.*, 172 F.3d at 1357.

compliance with section 101.³¹ Legislation introduced in Congress to restrict and weaken business method patents similarly equates business “apparatus” with business “methods.”³²

Although the only claim at issue in *State Street Bank* was an apparatus claim, the Federal Circuit nevertheless ruled on the merits of the so-called business method exception to patentability and the mathematical algorithm exception to patentability. The claim recited a data processing system comprising various means plus function clauses, each of which corresponded to a part of a computer that was programmed to carry out the function of managing a portfolio.³³ The district court had found that the claim was invalid both because it recited an unpatentable mathematical algorithm, and because it recited an unpatentable business method.³⁴

Having concluded that the district court had improperly interpreted the claim to be a process rather than a machine,³⁵ the Federal Circuit seemingly could have based its holding on the fact that neither the business method exception nor the mathematical algorithm exception was applicable to a claim to a machine. This would have been consistent with its earlier decision in *In re Alappat*,³⁶ which held that a machine programmed with a specific algorithm was patentable. Instead, the court proceeded to take on the business method exception directly, rejecting it as “ill-conceived”³⁷ and appearing to require only that a claim produce a “useful, concrete, and tangible result.”³⁸

The proposition that process claims and apparatus claims, even in the computer arts, should not be considered interchangeably for purposes of determining whether they recite statutory subject matter, can be demonstrated by a simple example. Consider the following two claims directed to an invention that allows two numbers to be added and the resulting sum displayed. Suppose that the patent specification describes a specialized device that includes summing circuits, an input keypad, and an electronic display for showing the result.

1. A method of adding two numbers, comprising the steps of:	2. An apparatus for adding two numbers, comprising:
(1) receiving first and second numbers;	(1) means for receiving first and second numbers;
(2) adding the first and second numbers to produce a sum; and	(2) means for adding the first and second numbers to produce a sum; and
(3) displaying the sum.	(3) means for displaying the sum.

Claim 1 recites a mathematical algorithm that is clearly nonstatutory under even the most liberal reading of Supreme Court precedent. Claim 2, on the other

³¹ See, e.g., *In re Meyer*, 688 F.2d 789, 795 (C.C.P.A. 1982); *In re Pardo*, 684 F.2d 912, 916 n.6 (C.C.P.A. 1982). This analysis was criticized, however, in *In re Bernhart*, 417 F.2d 1395, 1399 (C.C.P.A. 1969).

³² See *supra* text accompanying note 19.

³³ *State St. Bank*, 149 F.3d at 1371.

³⁴ *Id.* at 1372.

³⁵ *Id.* at 1371.

³⁶ *Alappat*, 33 F.3d at 1540-41.

³⁷ *State St. Bank*, 149 F.3d at 1375.

³⁸ *Id.*

hand, recites a statutory machine that, while closely paralleling the first claim, is clearly patentable under the principles of *Alappat* and other court decisions.

This illustrates one weakness in glossing over the statutory invention category to which the claim belongs. As is argued in more detail below, a process should recite a physical transformation in order to satisfy the statutory requirements for patentability, whereas an apparatus or machine need not recite such a transformation. It is therefore critical to consider the form in which a claim is cast in order to determine whether it satisfies the statutory requirements for patentability.

Ignoring the form in which the claim is cast becomes even more problematic when following the Federal Circuit's admonition in *AT&T Corp.* that patentability turns on whether there is a "practical application" for the claimed subject matter. For example, Einstein's famous equation $e=mc^2$ has numerous practical applications in fields such as atomic bombmaking and nuclear reactors. But the equation itself cannot be patented despite the existence of many practical applications. The critical difference is in how the invention is claimed.

One way of potentially resolving this problem is to require that the practical application be recited in the claim (for example, a method of creating an atomic bomb of a given energy force by calculating the amount of energy from the equation $e=mc^2$). But this creates its own problems, including violating precedent rejecting so-called "field of use" restrictions on mathematical algorithms. A nonstatutory mathematical algorithm claim cannot become statutory merely by reciting the intended application of the algorithm.³⁹ Such claims might also be rejected for indefiniteness under 35 U.S.C. § 112, second paragraph. If the claim is not specific enough regarding how the practical application is achieved, it could be rejected on that basis. Nevertheless, the PTO takes the position that a particular utility need not be recited in the claim.

A better solution to this problem, as outlined below, is to require that a process claim recite some sort of physical transformation as part of the process. Requiring recitation of the transformation process ensures that the claimed invention will not recite an abstract idea, since by definition something that exists in tangible form – even at the microscopic level – cannot be an abstract idea. The physical transformation requirement thus distinguishes abstract ideas, principles, and laws of nature from patentable subject matter. The separate requirement for practical utility ensures that the claimed invention satisfies the "useful arts" aspect intended by the framers of the Constitution.

IV. LIMITS ON BUSINESS METHOD PATENTS

Are there any limits on so-called business method patents? Although the courts will not attach any legal significance to whether a particular claim recites a business-related method, some patent law doctrines could preclude the patentability of claims relating to business method inventions. The following sets forth some of these doctrines.

³⁹ *Flook*, 437 U.S. at 586, 589-90. The claimed method was specifically limited to a process comprising the catalytic chemical conversion of hydrocarbons. *Id.* at 586.

A. The “Useful Arts” Limitation

The Constitution authorizes Congress to protect inventions and discoveries in the “useful arts.”⁴⁰ The Supreme Court has made it clear that Congress may not exceed the scope of this grant of authority.⁴¹ The term “useful arts” has been interpreted to be identical in scope to “technological arts,” thus shifting the definition problem from one term to another.⁴² The Court of Customs and Patent Appeals has stated that, “All that is necessary, in our view, to make a sequence of operational steps a statutory ‘process’ within 35 U.S.C. § 101 is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of ‘useful arts.’”⁴³ So, what are “useful arts” or “technological arts?”

The definitional problems arising from restricting patents to the “technological arts” are bewildering.⁴⁴ Surely Congress did not intend to lock into the Constitution only those “useful arts” that existed at the time the document was drafted. Science, after all, is constantly changing, with new sciences having been developed over the centuries. Consequently, the definition of “useful arts” must adapt with time so as to encompass new technologies as they are developed.

Yet not all “arts” constitute “useful arts.” For example, literature, history, and other fields of endeavor certainly can be considered “arts,” but they are surely not the “useful arts” in the sense contemplated by the framers of the Constitution.⁴⁵ Does this mean that patents should only be granted for inventions that clearly fall within the purview of science or engineering? What about medicine? What about economics, particularly applied economics, which relies on scientific theories and principles? If an artist develops a new painting technique, is that a “useful art” as opposed to a “fine art?” What if the artist is able to increase his or her efficiency in creating paintings by using a new and non-obvious assembly line of painting stations, each of which operates on a predefined portion of the canvas? Would such a technique render it patentable, changing it from a “fine art” to a “useful art?”

Curiously, it appears that no court has ever invalidated a patent claim on the basis that it did not fall within the “technological arts.”⁴⁶ Although the PTO’s Manual of Patent Examining Procedure states that claims can be rejected under section 101 of the statute if they are “devoid of any limitation to a practical application in the technological arts,”⁴⁷ many patents have issued in such “non-

⁴⁰ U.S. CONST. art. I, § 8.

⁴¹ *Graham v. John Deere Co.*, 383 U.S. 1, 5-6 (1966).

⁴² *In re Toma*, 575 F.2d 872, 877 (C.C.P.A. 1978).

⁴³ *In re Musgrave*, 431 F.2d 882, 893 (C.C.P.A. 1970); *see also In re Waldbaum*, 457 F.2d 997, 1003 (C.C.P.A. 1972) (Rich, J., concurring) (equating “technological arts” with “useful arts.”).

⁴⁴ *See* Alan L. Durham, *Useful Arts in the Information Age*, *BYU L. REV.* 1419 (1999), for an exhaustive treatment of possible meanings of the term “useful arts” and a proposal for applying the term broadly.

⁴⁵ *See* *Paulik v. Rizkalla*, 760 F.2d 1270, 1276 (Fed. Cir. 1985) (explaining that the constitutionally derived exclusive right was for “technological innovation”).

⁴⁶ An unpublished opinion of the Board of Patent Appeals and Interferences ruled that a method of evaluating an intangible asset by performing various steps of establishing variables, scoring performance criteria statements, and physically plotting a point on a chart failed to recite statutory subject matter because it did not fall in the “technological arts.” *Ex Parte Bowman*, 61 U.S.P.Q.2d 1669 (Bd. Pat. App. Intf. 2001) (unpublished).

⁴⁷ *MANUAL OF PATENT EXAMINING PROCEDURE* § 2106 II.A. (Aug. 2001 ed.).

technological” areas as hair cutting, athletics, and teaching.⁴⁸ Consequently, it is unclear how rigorously the PTO enforces this restriction, and what definition it applies in determining what qualifies as “technological.”

In its seminal decision in *Diamond v. Diehr*⁴⁹, the Supreme Court referred approvingly to the claimed process for curing rubber as like other “industrial processes . . . which have historically been eligible to receive the protection of our patent laws.”⁵⁰ Yet that decision did not seem to turn on evidence of industrial applicability.⁵¹ And unlike Europe, which imposes an “industrial applicability” requirement on patents,⁵² the United States has no such statutory limitation, unless the court-imposed “technological” limitation is the same as Europe’s “industrial” requirement.⁵³

A modern dictionary defines the word “industrial” as “of or relating to industry.”⁵⁴ The same dictionary defines “industry” as “systematic labor especially for some useful purpose or the creation of something of value . . . a department or branch of a craft, art, business, or manufacture, especially one that employs a large personnel and capital especially in manufacturing.”⁵⁵ The same dictionary defines “technology” as “the practical application of knowledge, especially in a given area,” and “technical” as “having special and usually practical knowledge especially of a mechanical or scientific subject.”⁵⁶

These definitions are seemingly unhelpful in segregating inventions relating to useful or technological arts from those relating to other arts. Yet the definitions are loosely consistent with one common theme that distinguishes most technological arts from the liberal arts: that of transforming physical things. The practice of law, a method of memorizing names, the study of history, and the playing of a musical instrument all lack any transformation of physical materials or objects. On the other hand, mixing chemicals, operating a computer, and cutting a piece of metal all involve transforming physical things, even if only at the microscopic level.

The distinction is not perfect. For example, the act of painting a picture surely transforms a blank canvas into a painted canvas and yet that does not make it a “useful art” in the Constitutional sense. But a new type of paintbrush for use by an artist would unquestionably be patentable. Similarly, treating a patient for a medical condition by giving the patient a new drug would seem to present a close

⁴⁸ See Section I, *supra*.

⁴⁹ 450 U.S. 175 (1981).

⁵⁰ *Id.* at 184.

⁵¹ *Id.*

⁵² The European Patent Convention Article 52, extends patent protection to “any inventions which are susceptible of industrial application, which are new and which involve an inventive step.” The article specifically excludes, among other things, schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers. *Id.* The European Patent Convention Article 57 further defines “industrial application” as follows: “[a]n invention shall be considered as susceptible of industrial application if it can be made or used in any kind of industry, including agriculture.”

⁵³ In this regard, note Judge Baldwin’s concurring opinion in *Musgrave*, 431 F.2d at 895 (Baldwin, J., concurring) (“Is this term [technological arts] intended to be synonymous with the ‘industrial technology’ – mentioned by Judge Smith?”).

⁵⁴ Merriam Webster’s Collegiate Dictionary (10th ed. 1997).

⁵⁵ *Id.*

⁵⁶ *Id.*

case. Although the act of giving the medicine itself does not “transform” anything, once the medicine enters the body of the patient it “transforms” the patient’s body in some manner.

The Constitutional limits imposed by the term “useful arts” are unclear and will require further clarification by the courts in future cases. Nevertheless, focusing on whether a claim recites a transformation of physical matter can serve as a rough proxy for dividing the traditional “liberal” arts from the traditional “industrial” arts. The use of this proxy in a proposed test for patenting process claims is discussed in more detail herein.

B. The Statutory Requirement of a “Process”

One way of determining whether a given method claim recites statutory subject matter is to focus on the meaning of the word “process.” Section 101 of the patent statute extends patent protection to a “process,” and section 100(b) of the statute defines a process somewhat circularly as “process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.”⁵⁷

In an 1877 case, *Cochrane v. Deener*⁵⁸, the Supreme Court defined a process as:

a mode of treatment of certain materials to produce a given result It is an act or a series of acts performed on the subject-matter to be transformed and reduced to a different state or thing.⁵⁹

The claimed invention in that case, which the Court found to be patentable, recited a process for manufacturing flour in order to improve its quality.⁶⁰ The process included steps of taking out superfine flour; taking out impurities by screening and blowing; and regrinding and rebolting the purified middlings.⁶¹ The Court concluded that there was no need for the claims to be limited to any particular machinery, and provided the above-quoted definition of a process in support of its conclusion that the process was patentable.⁶² Thus, one reading of the decision is that a process is patentable if it involves a series of acts performed on materials that causes the materials to be transformed into a different state or thing.

The Supreme Court again considered the patentability of processes in *Tilghman v. Proctor*⁶³. In that case, the patent related to a process of separating fats and oils into various other substances.⁶⁴ The claim recited a process of “the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure.”⁶⁵ The Court noted that during the process a chemical change took

⁵⁷ 35 U.S.C. § 100(b) (1994).

⁵⁸ 94 U.S. 780 (1877).

⁵⁹ *Cochrane*, 94 U.S. at 787-88.

⁶⁰ *Id.* at 781.

⁶¹ *Id.* at 785-86.

⁶² *Id.* at 788.

⁶³ 102 U.S. 707 (1880).

⁶⁴ *Tilghman*, 102 U.S. at 708.

⁶⁵ *Id.* at 709.

place in the fat due to the heat and pressure, a process that Tilghman had discovered.⁶⁶ The Court acknowledged that Tilghman had used different types of machines to carry out the process,⁶⁷ and thus his patent was not limited to any particular apparatus.⁶⁸ The Court also quoted approvingly from an 1853 Supreme Court decision, including the following passage that seems to define the word “process:”

The term ‘machine’ includes every mechanical device or combination on mechanical powers and devices to perform some function or to produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations are called processes.⁶⁹

The *Tilghman* Court distinguished the claimed process from a “mere principle” as follows. The principle was characterized as the scientific fact that the elements of neutral fat must be united with an atomic equivalent of water in order to be separated from each other and become free.⁷⁰ The patented process, on the other hand, was the method of separating the elements by subjecting the fat with water to a high degree of heat.⁷¹ The Court concluded that the latter steps qualified as “most certainly a process.”⁷²

One reading of *Tilghman* is that if a process claim recites a chemical action; the application of some element or power of nature; or an interaction between substances, the claim will meet the requirement of a “process” and will be considered statutory subject matter. Note that Tilghman’s claim involved both chemical reactions and application of a “power of nature” (i.e., heating).

In its 1969 decision in *In re Prater*⁷³, the CCPA characterized the Supreme Court’s definition of a process in *Cochrane* as dictum, concluding that there was no requirement that a process must operate physically upon substances in order to be patentable.⁷⁴ According to the CCPA, the *Cochrane* decision stood merely for the proposition that a process is not limited to the means used in performing it.⁷⁵ This seems to be a strained reading of *Cochrane*. An earlier version of the *Prater*⁷⁶ decision, which was later superseded, contained an even more limiting analysis of *Cochrane* and *Tilghman*, and proposed a sweeping definition for a statutory process that essentially equated patentability with “industrial technology” and “useful arts”—i.e., to the limits of the Constitution.⁷⁷

⁶⁶ *Id.* at 713.

⁶⁷ *Id.* at 714.

⁶⁸ *Id.* at 713-14.

⁶⁹ *Tilghman*, 102 U.S. at 722.

⁷⁰ *Id.* at 712-23.

⁷¹ *Id.* at 729.

⁷² *Id.*

⁷³ 415 F.2d 1393 (C.C.P.A. 1969).

⁷⁴ *Prater*, 415 F.2d at 1403.

⁷⁵ *Id.*

⁷⁶ *In re Prater*, 415 F.2d 1378 (1969), superseded following rehearing, *In re Prater*, 415 F.2d 1393 (C.C.P.A. 1969).

⁷⁷ *Id.* at 1389.

The Supreme Court in 1909 clarified that a patent could be granted for a process involving mechanical steps such as cutting and bending sheet metal.⁷⁸

Many decades later, the Supreme Court's trilogy of *Gottschalk v. Benson*,⁷⁹ *Parker v. Flook*,⁸⁰ and *Diamond v. Diehr*⁸¹ attempted to clarify what constituted a statutory process.

In *Benson*, the claimed invention recited a method of converting signals from binary coded decimal form into binary form, including steps of storing, shifting, and adding various signals in registers.⁸² The Court held that the claimed invention was nothing more than an abstract process that was so "sweeping as to cover both known and unknown uses" of the conversion process.⁸³ Quoting approvingly from its earlier *Cochrane* decision, the Court stated, "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."⁸⁴

But in a confusing passage, the Court appeared to reject the argument that a process claim must either be tied to a particular machine or must operate to change articles or materials to a different state or thing.⁸⁵ The claim at issue was rejected on the different ground that it was an attempt to "wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself."⁸⁶ Consequently, the best reading of *Benson* is that a claim to a mathematical formula that effectively preempts the formula is unpatentable. No further elaboration to the definition of process, aside from this negative limitation, can be gleaned from the decision. The language rejecting a requirement that a process claim must operate to change articles or materials appears to be dictum, given that the Court did not discuss that point in any detail and invalidated the claim on a different ground.

A few years later, in *Flook*,⁸⁷ the Court struck down another process claim. The invention involved a method of updating alarm limits for use in a catalytic conversion process.⁸⁸ The primary novelty was in the mathematical formula used to calculate the new alarm limit; the claim recited steps of determining the value of a process variable; determining a new alarm base using particular equation; determining an updated alarm limit; and adjusting the alarm limit.⁸⁹

The Supreme Court concluded that the claim was not a "process" within the meaning of the patent statute because the novelty resided in a mathematical algorithm, which the Court treated as part of the unpatentable prior art for the purposes of analyzing the claim.⁹⁰ Once the algorithmic part was ignored as unpatentable, the rest of the claim merely recited a conventional process, which could

⁷⁸ *Expanded Metal Co. v. Bradford*, 214 U.S. 366, 385-86 (1909).

⁷⁹ 409 U.S. 63 (1972).

⁸⁰ 437 U.S. 584 (1978).

⁸¹ 450 U.S. 175 (1981).

⁸² *Benson*, 409 U.S. at 73.

⁸³ *Id.* at 68.

⁸⁴ *Id.* at 69-70.

⁸⁵ *Id.* at 71.

⁸⁶ *Id.* at 71-72.

⁸⁷ 437 U.S. 584.

⁸⁸ *Flook*, 437 U.S. at 585.

⁸⁹ *Id.* at 596.

⁹⁰ *Id.* at 595.

not be patented.⁹¹ At the end of its opinion, the Court stated, “[v]ery simply, our holding today is that a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101.”⁹² In another footnote, the Court stated that:

An argument can be made, however, that this Court has only recognized a process as within the statutory definition when it either was tied to a particular apparatus or operated to change materials to a ‘different state or thing.’ See *Cochrane v. Deener*, 94 U.S. 780, 787-788, 24 L.Ed. 1390. As in *Benson*, we assume that a valid process patent may issue even if it does not meet one of these qualifications of our earlier precedents. 409 U.S., at 71, 93 S.Ct., at 257.⁹³

Only three years later, in *Diehr*,⁹⁴ the Supreme Court eliminated the requirement that the mathematical algorithm be deemed part of the prior art for the purposes of analyzing the statutory viability of a claim under section 101 of the patent.⁹⁵ The Court held that the claimed method of operating a rubber-molding press by using a mathematical equation to determine when the press should be opened met the requirements of a “process” as that term was used in the statute and the case law.

After quoting with approval the “transformation” language in *Cochrane*, the Court stated that, “we think that a physical and chemical process for molding precision synthetic rubber products falls within the § 101 categories of possibly patentable subject matter. That respondents’ claims involve the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing cannot be disputed.”⁹⁶ The Court also stated that, “industrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws.”⁹⁷ In contrast to *Benson* and *Flook*, the Supreme Court actually applied the process definition announced in *Cochrane* and, finding that the definition was satisfied, upheld the patentability of the claim.

The Federal Circuit confronted the outer limits of a statutory process in its 1994 *In re Schrader*⁹⁸ decision. In that case, the court held that a method of competitively bidding on items, including various steps of identifying related items in a record; offering the items to potential bidders; receiving bids; indexing the bids, and identifying bids corresponding to a prevailing total price, failed to recite a statutory process under section 101 of the statute.⁹⁹ According to the Federal Circuit, “[w]hen Congress approved the addition of the term “process” to the categories of patentable subject matter in 1952, it incorporated the definition of “process” that had evolved in

⁹¹ *Id.* at 594.

⁹² *Id.* at 595 n.18.

⁹³ *Flook*, 437 U.S. at 589 n.9.

⁹⁴ 450 U.S. 175.

⁹⁵ *Diehr*; 450 U.S. at 188-89.

⁹⁶ *Id.* at 184.

⁹⁷ *Id.*

⁹⁸ *In re Schrader*, 22 F.3d 290 (Fed. Cir. 1994).

⁹⁹ *Id.*

the courts.¹⁰⁰ As of 1952, that term included a requirement that there be a “transformation or reduction of subject matter.”¹⁰¹ In addition to citing *Diehr*, the court also quoted its earlier decision in *Arrythmia Research Technology, Inc. v. Corazonix Corp.*¹⁰² for the proposition that transformation of subject matter “representative of or constituting” physical activity or objects, such as human cardiac activity or X-ray attenuation data representative of CAT scan images, could supply the necessary transformation.¹⁰³ But the court concluded that there was nothing physical at all about the claim, and rejected it as nonstatutory.¹⁰⁴

Then, in 1999, the Federal Circuit appeared to change its mind. In *AT&T Corp.*,¹⁰⁵ the court concluded that no physical transformation was necessary after all.

The claimed invention in *AT&T Corp.* provided a method of indicating a telephone call recipient’s primary interexchange carrier (PIC) in a message record.¹⁰⁶ The invention was designed to operate in a telecommunication system having multiple long-distance service providers. The system contains local exchange carriers (LECs) and long-distance service carriers (IXCs).¹⁰⁷ Each customer has a local exchange carrier that provides access to the long-distance service carriers; the customer selects a long-distance carrier, such as AT&T, to be its primary long-distance service carrier or PIC.¹⁰⁸

Some long-distance service carriers, like Excel, contract to route their subscribers’ calls through various switches and transmission lines.¹⁰⁹ The system relies on a three-step process when a caller makes a long-distance call. First, the call is transmitted to the LEC, which identifies the caller’s PIC and automatically routes the call to the facilities used by the caller’s PIC.¹¹⁰ Second, the PIC’s facilities carry the call to the LEC that serves the person being called.¹¹¹ Finally, the call recipient’s LEC delivers the call over its local network to the recipient’s telephone.¹¹² A switch in the network monitors and records information relating to the call for billing purposes.¹¹³ This information is recorded in an “automatic message account” message record, which indicates the originating and terminating telephone numbers, and the length of time for the call.¹¹⁴

The inventive process involved adding a data field into the standard message record to indicate whether a call involves a particular PIC (the “PIC indicator”).¹¹⁵ The PIC indicator enabled interexchange carriers to provide differential billing for

¹⁰⁰ *Id.* at 295.

¹⁰¹ *Id.*

¹⁰² 958 F.2d 1053 (Fed. Cir. 1992).

¹⁰³ *Schrader*, 22 F.3d at 294.

¹⁰⁴ *Id.*

¹⁰⁵ 172 F.3d at 1359.

¹⁰⁶ *Id.* at 1353.

¹⁰⁷ *Id.*

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *AT&T Corp.*, 172 F.3d at 1354.

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ *AT&T Corp.*, 172 F.3d at 1354.

calls on the basis of an identified PIC.¹¹⁶ Claim 1 of the patent recited two steps: (1) generating a message record for an interexchange call between an originating subscriber and a terminating subscriber; and (2) including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.¹¹⁷

The issue was whether this claim recited a “process” as that term was used in the patent statute.¹¹⁸ The district court had concluded that the claim was an unpatentable mathematical algorithm.¹¹⁹ The Federal Circuit concluded that it was not, and upheld the patentability of the claim.¹²⁰

The court began by distinguishing the Supreme Court’s decisions in *Flook* and *Benson* as “narrowly limited” to claiming mathematical algorithms in the abstract.¹²¹ This was consistent with the Supreme Court’s treatment in *Diehr*, which appeared to narrowly interpret those earlier decisions. In reliance on the Federal Circuit’s decision in *State Street Bank*, the court concluded that because the algorithm in the claim was applied in a useful way to produce a useful, concrete, and tangible result without preempting other uses of the mathematical principle, it was not invalid as an unpatentable mathematical algorithm.¹²²

But the court went further. Excel had also argued, relying on the authority of *Diehr* and *Schrader*, that the method claims were not patentable because there was no physical transformation or conversion of subject matter from one state into another. Judge Plager, who had written the earlier decision in *Schrader*, concluded that the notion of physical transformation could be misunderstood. Pointing to the Supreme Court’s use of the signal “e.g.” when referring parenthetically to a function that the patent laws were designed to protect, he concluded that physical transformation was not an invariable requirement, but merely one example of how a mathematical algorithm could bring about a useful application.¹²³

According to the court, the transformation that occurred in the earlier *Arrhythmia* decision merely “confirmed” that the process had been applied to produce a number that had a specific meaning.¹²⁴ In other words, it was not the transformation itself that rendered the claim statutory, but the fact that the result of the claimed process was a useful number.¹²⁵ As discussed below, this blending of the usefulness and transformation requirements is problematic in this author’s opinion, because it eliminates an important determinant of process patentability under Supreme Court and prior Federal Circuit precedent. The court concluded that the analysis in *Schrader* was now “unhelpful” in light of the recent *State Street Bank* analysis.¹²⁶

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.* at 1355.

¹¹⁹ *Id.*

¹²⁰ *AT&T Corp.*, 172 F.3d at 1361.

¹²¹ *Id.* at 1356.

¹²² *Id.* at 1358.

¹²³ *Id.* at 1358-59.

¹²⁴ *Id.* at 1359.

¹²⁵ *AT&T Corp.*, 172 F.3d at 1359.

¹²⁶ *Id.* at 1360.

The *AT&T Corp.* case is the latest word from the Federal Circuit on the requirements of patentability for process claims. The Federal Circuit stated that, “our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result.”¹²⁷ No longer is any physical transformation required in a process claim, as long as this practical application requirement has been met. It is likely that few business method claims will fail to meet this practical application test. Therefore, the definition of “process” in the patent statute imposes a very low hurdle under present case law.

Although the Federal Circuit’s decision in *Arrythmia* seemed to endorse processes that transform *data* if that data *represented* physical quantities, the Supreme Court has not endorsed that view. Consequently, it is unclear whether transformation of something representing physical matter, as opposed to transformation of the matter itself, is sufficient to support patentability. In light of the argument that computer instructions *per se* involve sufficient physical transformation, however, the distinction may not be material.

C. The “Mental Steps” Doctrine

There is a body of case law, known as the “mental steps” doctrine, which supposedly precludes patentability for claims that recite purely mental steps. Early decisions by the CCPA, including *In re Heritage*¹²⁸ and *In re Abrams*¹²⁹, stated that purely mental acts were not the proper subject matter for protection under the patent statute. The invention in *Abrams*, which related to a method of petroleum prospecting, recited steps such as “measuring,” “determining,” and “comparing.”¹³⁰ The CCPA affirmed the rejection of these claims on the ground that they recited “mental concepts which . . . are not patentable.”¹³¹

Later decisions by the CCPA severely curtailed this doctrine, leaving the validity of the doctrine in doubt. In *In re Musgrave*,¹³² the inventor claimed a method of establishing corrections in seismic exploration, including various steps such as “generating signals” and “applying corrections.”¹³³ The PTO had rejected the claims as being directed to nonstatutory mental steps and, after acknowledging the case law “to be something of a morass,” the court concluded that the claims were not unpatentable.¹³⁴ The court pointed to the specification, which disclosed that the invention could be practiced using a computer, and stated that “we cannot agree with the board that these claims (all the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because some or all the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think.”¹³⁵

¹²⁷ *Id.* at 1360.

¹²⁸ 150 F.2d 554 (C.C.P.A. 1945).

¹²⁹ 188 F.2d 165 (C.C.P.A. 1951).

¹³⁰ *Id.* at 168.

¹³¹ *Id.* at 168.

¹³² 431 F.2d 882 (C.C.P.A. 1970).

¹³³ *Id.* at 883-82.

¹³⁴ *Id.* at 890.

¹³⁵ *Id.* at 893.

The court described a very liberal standard for patentability, stating that, “[a]ll that is necessary, in our view, to make a sequence of operational steps a statutory ‘process’ within 35 U.S.C. § 101 is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of ‘useful arts.’”¹³⁶ The court speculated that claims directed to steps involving subjective judgment might be rendered indefinite, but that was a different question than whether it was a statutory “process.”¹³⁷ The *Musgrave* holding was thrown into doubt, however, when the Supreme Court issued its restrictive ruling in *Benson*, finding that a method for converting numerals could not be patented as a process.¹³⁸ *Benson* itself has been severely curtailed,¹³⁹ however, leaving some doubt as to the present state of the law.

In *In re Prater*,¹⁴⁰ the CCPA appeared to limit the “mental steps” doctrine to methods in which the process *required* the use of the human mind – a so-called “purely mental process.”¹⁴¹ According to the CCPA, as long as the specification disclosed something more than pencil and paper, the doctrine would not be applicable.¹⁴²

Finally, in *In re Meyer*¹⁴³, a case decided after *Benson* and *Prater*, the CCPA again pointed to a “mental process” that was unpatentable on the basis that it “has not been applied to physical elements or process steps.”¹⁴⁴ This was despite the fact that one of the claims at issue specifically recited an apparatus comprising various means for carrying out the functions.¹⁴⁵ This erroneous application of the “mental steps” doctrine to a claim that specifically recited apparatus reveals one of the problems in treating process and apparatus claims interchangeably. Just as it makes no sense to treat a specifically recited apparatus as a process, application of the “mental steps” doctrine to a physical machine also makes no sense.

The rationale for interchangeable treatment of process and apparatus claims is likely diminished in light of the Federal Circuit’s later decision in *Alappat*,¹⁴⁶ which held that a similarly drafted claim recited a statutory machine. Nevertheless, as explained previously, the Federal Circuit continues to look behind the drafting of the claim for purposes of section 101. The *Meyer* court also relied in part on the so-called “Freeman-Walter” test,¹⁴⁷ which was itself discarded in the later *State Street Bank* decision. So the validity and scope of the mental steps doctrine is still in question.

Assuming there is any vitality left to the mental steps doctrine, various business-related method claims might be rejected as non-statutory. Examples include methods of teaching or instruction; methods of memorization or learning; and methods of speaking a new language.

¹³⁶ *Id.*

¹³⁷ *Musgrave*, 431 F.2d 893.

¹³⁸ *Benson*, 409 U.S. 63.

¹³⁹ *See Diehr*, 450 U.S. at 188.

¹⁴⁰ *Prater*, 415 F.2d 1393.

¹⁴¹ *Id.* at 1402 n.22.

¹⁴² *Id.* at 1405.

¹⁴³ 688 F.2d 789 (C.C.P.A. 1982).

¹⁴⁴ *Meyer*, 688 F.2d at 796.

¹⁴⁵ *Id.* at 793.

¹⁴⁶ 33 F.3d 1526.

¹⁴⁷ *Meyer*, 688 F.2d at 794.

Another possible objection to claims reciting purely mental steps arises from the Constitution. If enforced against an infringer, a patent on a purely mental method could literally prevent somebody from thinking. The PTO solicitor argued in a petition for rehearing in 1968 that such claims would run afoul of the First, Ninth, and Tenth Amendments to the Constitution.¹⁴⁸ The CCPA declined to resolve that question.

In short, the validity of the mental steps doctrine is in doubt, but aspects of the doctrine could be resurrected by the Federal Circuit or Supreme Court in a future case. As explained in more detail below, the doctrine would be obviated by requiring that every process claim recite a transformation of matter in order to render it patentable.

D. The “Personal Skills” Doctrine

Some have suggested that “personal skills” such as teaching, athletic techniques, haircutting methods, and similar activities should not qualify as inventions under the U.S. patent laws. Nevertheless, despite a proposal in Congress to place limitations on such patents,¹⁴⁹ there is no such exception to patentability under current U.S. law, and numerous patents have issued in this general area.¹⁵⁰

The Canadian Patent Office has interpreted its patent laws as precluding the patentability of “subject matter that is a process or the product of a process, that depends entirely on artistic or personal skills, such as: procedures for exercising, teaching, cosmetological procedures, hair dressing, pedicure, flower arranging, painting pictures or playing musical instruments.”¹⁵¹ The same rules apply to “a process of surgery or therapy.”¹⁵² The basis for excluding such processes is that they are not considered to meet the definition of an invention under Canadian law. The word “invention” as defined under Canadian law closely tracks the U.S. statutory definition, but it includes the following specific exclusion: “An art must accomplish some change in the character or condition of material objects. Any art which belongs to the professional fields and which is a manual art or skill is not an art within the meaning of Section 2 of the Patent Act.”¹⁵³

One could argue that new methods of practicing medicine qualify as “personal skills” that should be excluded from patentability. But Congress in 1996 responded to criticism that doctors were unfairly patenting surgical methods by

¹⁴⁸ *Prater*, 415 F.2d at 1400 n.20.

¹⁴⁹ See H.R. 1332, 107th Cong.

¹⁵⁰ See, e.g., U.S. Patent No. 6,257,248 (issued July 10, 2001) entitled “Both Hand Hair Cutting Method”; U.S. Patent No. 4,022,227 (issued May 10, 1977) entitled “Method of Concealing Partial Baldness”; U.S. Patent No. 5,992,027 (issued Nov. 30, 1999) entitled “Method of Determining the Correct Size in Women’s Sewing Patterns”; U.S. Patent No. 5,851,117 (issued Dec. 22, 1998) entitled “Building Block Training Systems and Training Methods”; U.S. Patent No. 5,558,519 (issued Sept. 24, 1996) entitled “Method for Instruction of Golf and the Like”; and U.S. Patent No. 5,443,036 (issued Aug. 22, 1995) entitled “Method of Exercising a Cat.”

¹⁵¹ See *Examples of Non-Statutory Subject Matter*, § 16.04, available at http://strategis.ic.gc.ca/sc_mrksv/cipo/patents/mopop/ch16-e.pdf (last visited Oct. 14, 2002).

¹⁵² *Id.*

¹⁵³ See *Definition of a Statutory Invention*, Section § 16.02, available at http://strategis.ic.gc.ca/sc_mrksv/cipo/patents/mopop/ch16-e.pdf (last visited Oct. 14, 2002).

enacting a limited restriction on enforcement of such patents.¹⁵⁴ The fact that Congress addressed this perceived evil by narrowly limiting enforcement of surgical method patents rather than excluding such patents from patentability indicates that Congress did not intend to exclude such patents from the patent laws. It also evidences intent that Congress did not intend to enact a broader “personal skills” exception to patentability. Numerous patents have issued for various methods of treating medical conditions using both drugs and by manipulating the human body.¹⁵⁵

There is presently no “personal skills” exception to patentability. To the extent that courts in the future decide to exclude such patents from the scope of patent protection, such exclusion could probably better be handled through an affirmative delineation of the scope of the “useful arts” limitation rather than creating another negative patentability doctrine. In other words, the term “useful arts” would not extend to personal skills not used in a technological sense – whatever “technological” means.

E. Inventions Lacking Actual Utility

Section 101 of the patent statute requires that patents may only be granted for “useful” processes. The Federal Circuit has interpreted this to require “practical” utility.¹⁵⁶ Some inventors nevertheless have persisted in filing patent applications for inventions that are inoperative according to modern laws of physics, such as perpetual motion machines.¹⁵⁷

Such inventions are treated as not useful in the statutory sense because they are impossible to operate with any utility. Business method inventions falling into this category might include inventions having no useful purpose, such as a method of clogging a sink or a method of making a window dirty. Another example might be a method of using a computer to generate random numbers, where no utility is disclosed or evident for the method. Given the generally liberal requirement for utility,¹⁵⁸ however, it is unlikely that many business method patents would fail to overcome such a hurdle.

¹⁵⁴ 35 U.S.C. § 287(c) (1994 & Supp. 1997) (proscribing enforcement of patent infringement remedies against “medical practitioners” for certain “medical activities”).

¹⁵⁵ See, e.g., U.S. Patent No. 6,305,380 (issued Oct. 23, 2001) entitled “Method For Treatment of Cancer and Infectious Disease”; U.S. Patent No. 5,732,717 (issued Mar. 31, 1998) entitled “Method For Treating Substance Abuse Withdrawal”; U.S. Patent No. 6,212,433 (issued Apr. 3, 2001) entitled “Method For Treating Tumors Near the Surface of an Organ”; U.S. Patent No. 6,199,555 (issued Mar. 13, 2001) entitled “Cancer Treatment Method”; U.S. Patent No. 6,347,633 (issued Feb. 19, 2001) entitled “Treatment of Hepatitis C Using Hyperthermia.”

¹⁵⁶ See, e.g., *State St. Bank*, 149 F.3d at 1373.

¹⁵⁷ See, e.g., *Newman v. Quigg*, 877 F.2d 1575 (Fed. Cir. 1989).

¹⁵⁸ *In re Nelson*, 280 F.2d 172, 178-79 (C.C.P.A. 1960).

F. Abstract Ideas & Pure Mathematical Algorithms

As noted above, the Supreme Court has made it clear that patents may not claim abstract ideas and mathematical algorithms *per se*. In light of its decision in *Diehr*, which narrowly interpreted this exception to patentability, few if any business methods would fall into this trap. But differentiating abstract ideas from non-abstract ideas can prove difficult. Nevertheless, claims that fail to recite some minimal real-world application might be rejected on this basis.

It is, of course, impossible for a physical machine to be merely an abstract idea. Given that the name of the game is the claim, a business method that is cast in the form of an apparatus claim should never be rejected under this doctrine.

V. TOWARD A REQUIREMENT FOR TRANSFORMATION OF MATTER

As suggested above, the Federal Circuit's decision in *AT&T Corp.* eliminated the requirement that a process claim contain any sort of transformation in order to render the claim patentable. Instead, that decision collapsed the usefulness requirement of the statute with the physical transformation requirement contained in Supreme Court precedent. To that extent, the *AT&T Corp.* decision is arguably inconsistent with *Diehr* and the other cases set forth above, all of which provided a definition of "process" that included a transformation requirement.

Apparently, then, any type of method – including a business method – that produces a "useful" result but that involves no physical steps would be patentable. Examples include the method of interviewing a job candidate discussed in section I *supra*; methods of teaching that increase learning retention; methods of shopping that result in a reduction in prices paid for goods. Nor is it analytically helpful to characterize certain methods such as these as merely abstract ideas. Such a characterization would merely shift the inquiry to defining what is meant by an abstract idea.

Unless the "useful arts" limitation or one of the other doctrines outlined above is used to further limit the scope of such methods, there is apparently no limit to such claims. Surely this is not what the Supreme Court has endorsed.

A. Process Claims: Statutory if They Recite Physical Transformation of Matter

A better solution is to require that a process claim recite some sort of transformation of matter as part of the process. As explained above, the requirement for physical transformation finds support in several Supreme Court cases. The requirement for physical transformation thus arises directly from the statutory definition of a process as interpreted by the Supreme Court.

Requiring recitation of the transformation in the claim ensures that the claimed invention cannot cover an abstract idea, since by definition something that exists in tangible form – even at the microscopic level – cannot be an abstract idea. The physical transformation requirement thus distinguishes abstract ideas, principles, and laws of nature from patentable subject matter. It also accomplishes what the mental steps doctrine intended to accomplish – preventing patents on purely mental

concepts. A new method of thinking or speaking would involve no transformation of physical subject matter, unless it also included a transformative step.

Requiring a physical transformation also eliminates the need for the mathematical algorithm exception to patentability. If a method claim recites a physical transformation step, the method cannot wholly preempt the use of the algorithm.

Requiring a transformation of matter also ensures that the claimed invention satisfies the “useful arts” aspect intended by the framers of the Constitution. As explained previously, a transformation of matter requirement provides a reasonably good proxy for separating the “useful arts” such as engineering and science from the “fine arts” such as literature, history, and painting.

Admittedly, it is not perfect, since an artist painting on the canvas can be said to “physically transform” the canvas.¹⁵⁹ But that problem can be dealt with by treating the artist’s transformation – assuming that it is recited in a method claim – as a statutory process and rejecting the claim for lack of novelty or nonobviousness. In other words, once the painting process has been invented, it is obvious to apply any pattern or combination of paint to the canvas, rendering such methods unpatentable. An artist who creates a truly new process for applying paint to canvas – for example, by using a jet engine to blow the paint onto the canvas – would be entitled to a patent on the new process.

As to the possible argument that a human brain undergoes a physical transformation of matter when a new thought courses through the brain, the courts can surely deal with that problem by requiring that the physical transformation be artificially induced rather than naturally induced. For example, although a method of thinking would not be patentable because there is no artificially induced transformation of matter, a method of curing insomnia by hooking up a patient’s brain to electrodes would be patentable. A similar problem might arise from “transformative” steps such as writing on a piece of paper.

The Canadian patent law contains a definition of “invention” that closely tracks the U.S. requirement for utility in section 101 of the U.S. patent law.¹⁶⁰ The Canadian Patent Act, however, states that, “An art must accomplish some change in the character or condition of material objects.”¹⁶¹ The Act further defines “process” as “a mode or method of operation by which a result or effect is produced by chemical action, by the operation or application of some element or power of nature or of one substance to another.” This definition is surprisingly similar to the requirement suggested in early U.S. Supreme Court cases that a process must contain some physical transformation in order to render it patentable. In other words, not all processes in the literal sense are patentable – only those involving some tangible activity on physical entities would be patentable.

Nor would requiring a physical transformation have altered the outcome in *AT&T Corp.* The process claim at issue required steps of generating a message

¹⁵⁹ Another example of this sort of problem might be a method for running a new football formation: the players could conceivably be said to “transform” the ball on the field by moving it, kicking it, etc.

¹⁶⁰ See *Definition of a Statutory Invention*, § 16.02, available at http://strategis.ic.gc.ca/sc_mrksv/cipo/patents/mopop/ch16-e.pdf (last visited Oct. 14, 2002).

¹⁶¹ *Id.*

record and including in the message record an indicator having a particular value. These steps recite changes inside a physical computer or switch. Changing a value in a computer or switch alters the state of the computer or switch, which is sufficient to meet the physical transformation requirement. The same result would obtain for processes that cause other changes at microscopic levels.

To summarize, the Federal Circuit has required that in order to be patentable, an invention must produce a “useful, concrete, and tangible result.” For process claims, that should be only one of two requirements, the second requirement being the recitation of some sort of transformation of matter. As discussed above, changes occurring inside a computer by definition involve such a physical transformation. Requiring that such a change be reflected in the claim is a small price to pay for certainty.

B. Apparatus Claims: Per Se Statutory

It seems anomalous that a physical machine, which is what an apparatus claim covers, could be considered an abstract idea. Yet, as explained above, some court decisions can be read as rejecting apparatus claims as nonstatutory on the basis that they are attempting to cover an abstract idea.

The better solution is to hold apparatus claims to no more than the “useful, concrete and tangible result” standard. If the apparatus as disclosed has a practical application and recites some structure, no further inquiry is required.

This principle – that apparatus claims are per se statutory under section 101, even if they constitute a computer programmed with a mathematical algorithm – is consistent with the Federal Circuit’s holding in *Alappat*. In that case, the en banc Federal Circuit based its decision in part on the fact that the apparatus claim at issue contained means plus function clauses corresponding to circuit elements that were combined inside a machine.¹⁶² This, in combination with the fact that the claim preamble recited “a rasterizer” which was a machine having a particularly stated function, was sufficient in the Court’s opinion to render the claim statutory for purposes of section 101.

Although a mathematical algorithm by itself may not be statutory because it lacks any practical utility, the use of the mathematical algorithm in a computer constitutes a per se practical application of that algorithm, assuming that it is useful in the utilitarian sense of the word.

A method of adding two numbers and producing a sum would not be statutory. Nor would operating the method in a computer, unless the patent described a practical use for that algorithm. If the specification described, for example, that the computer programmed with the algorithm was useful as a cash register (i.e., for tabulating purchases by a customer), the minimum level of practical utility would be met, and the claim to the apparatus programmed with the algorithm would be statutory. Only if the computer programmed with the algorithm had no disclosed or apparent useful purpose would the claim fail. But it would fail not because of any “mathematical algorithm” exception – it would fail because it had no disclosed practical utility.

¹⁶² *Alappat*, 33 F.3d at 1544.

In short, claiming a computer programmed with an algorithm is not the same as claiming the naked algorithm. In light of the fact that many modern businesses use general-purpose computers to carry out algorithmic operations, some may argue that this exalts form over substance. But the form makes a critical difference. The patented apparatus leaves others free to practice the algorithm in their heads or on paper; or to use some future apparatus that does not fall within the scope of the claimed apparatus. They are not permitted to practice it in the claimed apparatus. Nothing about a claim to the machine prevents others from discussing, researching, or analyzing the algorithm. In any event, unlike copyright law, there is no “fair use” defense in patent law.

The Federal Circuit in *Alappat* recognized that a general purpose computer programmed with instructions creates a “new machine, because . . . [it] in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software.”¹⁶³ As stated by the Federal Circuit:

The instructions of the software program that carry out the algorithm electrically change the general purpose computer by creating electrical paths within the device. These electrical paths create a special purpose machine for carrying out the particular algorithm.¹⁶⁴

Some may argue that permitting an applicant to essentially cover a mathematical algorithm or other abstract process by limiting its use to a computer would provide overly broad patent protection to patent owners. There are at least three responses to this. First, as noted above, the public is free to use the algorithm by itself, either on paper or in their heads, so the algorithm is not “preempted” in the *Benson* sense.¹⁶⁵ Second, broad claims cut both ways, making it easier to show that the claim is invalid. To the extent that the PTO or an accused infringer could show that the same or a similar algorithm was in the prior art, it would seem a fairly obvious step to implement that algorithm in a computer as claimed. Third, nothing prevents the PTO from raising other objections to the claim, such as indefiniteness. To the extent that the claim is indefinite because it does not distinctly point out the subject matter intended to fall within the claims, the PTO can require a more narrowly tailored claim. But if an inventor has discovered a mathematical algorithm and has claimed it in combination with a physical computer, the algorithm cannot be “abstract.”

¹⁶³ *Id.* at 1545; *accord, Bernhart*, 417 F.2d at 1399-400 (“If a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged.”)

¹⁶⁴ *WMS Gaming Inc. v. International Game Tech.*, 184 F.3d 1339, 1348 (Fed. Cir. 1999); *see also, Bernhart*, 417 F.2d at 1400 (“if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed”).

¹⁶⁵ *Freeman*, 573 F.2d at 1247 n.11.

VI. CONCLUSION

In order to be patentable, a process must be both “useful” in the sense that it produces a useful result, and it must recite some transformation of matter to produce a different state or thing. It is possible to have a process that produces a useful and “concrete” result – as the Federal Circuit has defined it in *State Street Bank* – without requiring any transformation of matter.¹⁶⁶ It is also possible to have a transformative process that is not useful (e.g., a method of increasing traffic congestion by transmitting signals to automobiles, causing them to randomly slow down).

Either one of these examples could be made statutory by adding the missing requirement. A useful method of conducting an interview could be made transformative by adding to the claim a requirement that a computer program be used to transform an employment document into a preclearance rejection/acceptance letter. Similarly, the method of increasing traffic congestion could be rendered statutory by disclosing in the specification that the invention is actually useful for reducing traffic fatalities by forcing drivers to slow down.

Imposing a requirement for some physical manifestation of a transformation separates abstract ideas from applied ideas. For example, a method of operating on numbers according to steps that merely manipulate the numbers is unpatentable because although the steps may transform numbers in a literal sense, there is no physical manifestation of the transformation. Limiting the steps to execution in a digital computer, however, represents a physical manifestation of the transformation, because the execution of computer instructions changes the physical state of the machine – i.e., it turns it into a different machine.

Finally, the requirement for a transformation of matter is consistent with the “useful arts” limitation of the U.S. Constitution and the definition of “process” as interpreted by the Supreme Court. Future court decisions can delineate the boundaries of what constitutes sufficient transformation to render a claim statutory.

¹⁶⁶ One example is the method of conducting an interview set forth in Section I.



“INTERPRETIVE NECROMANCY” OR PRUDENT PATENT
POLICY? THE SUPREME COURT’S “ARISING UNDER” BLUNDER
IN *HOLMES GROUP V. VORNADO*

PROFESSOR JANICE M. MUELLER

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Cite as 2 J. MARSHALL REV. INTELL. PROP. L. 57

