"U.S. LAW: THE ABILITY TO ADAPT TO NEW TECHNOLOGY"

by

R. LEWIS GABLE* and MOREY B. WILDES**

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* R. Lewis Gable - Of counsel to Cowan, Liebowitz & Latman, PC. Patent Attorney with an electrical engineering degree and experience in computer, complex electronic, electrical and mechanical fields, including U.S. and International prosecution and licensing; frequent author and speaker about computer technology; author of Chapter 4, "Practice Under *Alappat* (and its Progeny) and the PTO Guidelines," ELECTRONIC SOFTWARE PATENTS, LAW AND PRACTICE, published 2000, The Bureau of National Affairs, Inc.

** Morey B. Wildes - Partner of Davidson, Davidson & Kappel, LLC. Patent Attorney with an undergraduate degree in physics and a masters degree in engineering mechanics. Mr. Wildes has substantial experience in both domestic and foreign patent prosecution related to the computer, medical device and mechanical fields, and in patent infringement, trademark infringement and antitrust litigation.

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U.S. LAW: THE ABILITY TO ADAPT TO NEW TECHNOLOGY

I. Introduction: "Sea-Changes in Both Law and Technology"

The Court of Appeals for the Federal Circuit ("Federal Circuit") in its most recent decision regarding the patentability of computer technology, *AT&T v. Excel*,[i] remarked, "The sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts while remaining true to basic principals." In 1968, the U.S. Patent and Trademark Office (USPTO) published guidelines essentially rejecting the notion that computer programs could be patented.[ii] On April 24, 1999 before a group of U.S. patent attorneys, the Deputy Assistant Commission for Patent Policy and Projects of the USPTO stated, "The USPTO takes a very expansive view of patentable subject matter." 35 U.S.C. § 101, the statute that defines which inventions may be patented, has not changed in the more than thirty years between these statements. Rather, the courts, including the Federal Circuit and its predecessor, the Court of Customs and Patent Appeals (CCPA), and the USPTO have significantly changed the statutory standard by which computer-related inventions are judged. During that span, one standard has for all practical purposes been discarded and a new one has been adopted. After explaining this evolution, we will discuss various examples in order to illustrate the range of patentable subject matter from those inventions deemed to be "Safe Harbors" to those on the cutting edge of statutory allowability.

II. The Evolution of the American Standard

A. The Two-Step Mathematical Algorithm Test

An early framework for § 101 determinations evolved around a two-step test that arose from a series of decisions of the CCPA, including *In re Freeman*[iii], *In re Walter*[iv] and *In re Abele*[v], and that is often referred to as the *Freeman-Walter-Abele* test. From 1978, when the CCPA issued *Freeman*, until 1994, when the Federal Circuit issued its watershed decision *In re Alappat*,[vi] the only test applied by the USPTO and the courts was the *Freeman-Walter-Abele* test. The CCPA in *Freeman*[vii] enunciated its two-step test as follows:

> Determination of whether a claim preempts nonstatutory subject matter as a whole ... requires a two-step analysis. First, it must be determined whether the claim directly or indirectly recites an "algorithm"... a claim which fails even to recite an algorithm clearly cannot wholly preempt an algorithm. Second, the claim must be further analyzed to ascertain whether in its entirety it wholly preempts that algorithm.[viii]

In *In re Meyer*[ix], the CCPA acknowledged that the two-step test was not the only test for making § 101 determinations.[x] In more recent years, the Federal Circuit has raised doubts about the applicability of the *Freeman-Walter-Abele* test to a variety of computer-related inventions. In the Federal Circuit's first opportunity to deal with § 101 in this field, *Arrhythmia Research Technology v. Corazonix Corp*[xi], Judge Newman, writing for the majority, confirmed that there were tests for dealing with computer-related inventions other than the *Freeman-Walter-Abele* test[xii]. In a concurring opinion, Judge Rader criticized the two-step test as depending upon the definition of an algorithm which "remained vague" and was without a "statutory anchor" in the four categories enumerated in § 101, namely, "any new and useful process, machine, manufacture, or composition of matter."[xiii] Further, according to Rader, the mathematical algorithm based test had ignored the standards set by the Supreme Court in *Benson*[xiv], *Flook*[xv] and *Diehr*[xvi]. Rader urged that *Diehr* had restricted the earlier *Benson* and *Flook* decisions, first, by limiting the definition of a mathematical algorithm to "only a mathematical procedure for solution of a specified mathematical problem" and, second, by relying on that statutory proposition stated in *Diehr*: "This Court has undoubtedly recognized limits to § 101 and every discovery is not embraced within the statutory terms. Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas."[xvii]

B. *Alappat*: The Federal Circuit Returns to the Primary Authorities

In a watershed decision, *In re Alappat*,[xviii] the Federal Circuit refocused the test used to determine subject matter patentability under § 101. Without mentioning the *Freeman-Walter-Abele* test by name, the Federal Circuit stated that § 101 determinations must be made in accordance with the primary authorities, that is, the statutory language of § 101 and the trilogy of Supreme Court decisions *Benson*[xix], *Flook*[xx] and *Diehr*[xxi]. In *Diehr*, the Supreme Court identified three categories of unpatentable subject matter:

> Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas (citations omitted). An idea of itself is not patentable. A principle, in the abstract, is a fundamental truth, an original cause, a motive; these cannot be patented, as no one can claim in either of them an exclusive right.[xxii]

While excluding laws of nature and ideas themselves, the Court stated that, "[a]n application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."[xxiii] To determine whether the algorithm in question was directed to such an application, the "claims must be considered as a whole."[xxiv] Clearly, an analysis of the claim recitations must be made to determine the relationship of the claimed mathematical algorithm to the other steps of the process or elements of the apparatus. The "transforming or reducing an article to a different state or thing" was key evidence of statutory subject matter.[xxv]

Judge Rich, writing for the majority in *Alappat*, noted that the use of the term "any" in § 101 required an expansive analysis of the four classes listed in that section, namely, process, machine, article of manufacture or composition of matter.[xxvi] Judge Rich interpreted the intent of the Supreme Court to extend § 101 to include "anything under the sun that is made by man."[xxvii] However, Judge Rich warned:

> Despite the apparent sweep of § 101, the Supreme Court has held that certain categories of subject matter are not entitled to patent protection. In *Diehr*, its most recent case addressing § 101, the Supreme Court explained that there are three categories of subject matter for which one may not obtain patent protection, namely, "laws of nature, natural phenomena, and abstract ideas." *Diehr*, 450 U.S. at 185.[xxviii]

Judge Rich noted that the Supreme Court has held that "certain mathematical subject matter is not, standing alone, entitled to patent protection"[xxix] and cautioned that the Supreme Court had not clarified whether mathematical subject matter was rendered unpatentable because it represents laws of nature, natural phenomena, or abstract ideas, much less what kind of mathematical subject matter was nonstatutory.[xxx] The mathematical algorithm, whatever its definition may be, was not a "fourth category" of nonstatutory subject matter. According to Judge Rich,

> Rather, at the core of the Court's analysis in each of these cases lies an attempt by the Court to explain a rather straightforward concept, namely, that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, and thus that subject matter is not, in and of itself, entitled to patent protection.[xxxi]

C. Both the Federal Circuit and the USPTO Have Played Significant Roles in the Evolution of the Statutory Standard

The Federal Circuit has appellate jurisdiction over all patent issues arising in lower, trial court decisions, typically involving claims of patent infringement, and over the decisions made by the USPTO on the patent applications it examines. Although subject to the appellate review of the Federal Circuit, the USPTO has played an amazing role in the definition and interpretation of the statutory standard. *Alappat* and the other decisions of the Federal Circuit that immediately followed caused havoc among the patent bar and the patent examining corps. In the framework of American jurisprudence, the Federal Circuit can only speak to the issues of the particular case before it and is restrained in explaining how its decisions fit together in an integrated body of law. Stepping into this vacuum, the USPTO published its Examination Guidelines for Computer-Related Inventions ("the Guidelines") on February 29, 1996.[xxxii] Included in the Guidelines is a flowchart entitled Examination Procedures for Computer-Related Inventions ("Examination Flowchart") that shows the sequence of examination steps to which the USPTO would subject a computer-related claim.[xxxiii] Each step is typically

represented by a separate box and was explained in detail in a corresponding section of the Guidelines. The Examination Flowchart ties the steps together into a comprehensive examining process, which could be applied to a wide range of computer technology in order to provide an indication as to whether it is or is not statutory.

To clarify the Guidelines, the USPTO further provided a set of claim examples covering a broad spectrum of computer technology including machine, process, manufacture, descriptive material, compression/encryption, methods of doing business and mathematical methods.[xxxiv] Each claim example is accompanied by a table explaining how each step of the Examination Flowchart would be applied by the USPTO to the example claim and by a set of table notes teaching in greater detail how the critical steps of the flow diagram are applied to the particular claim example.

After the Guidelines went into effect, the mathematical algorithm focused *Freeman-Walter-Abele* test was basically out, and the primary authorities were in. The Guidelines stated that "[t]he Freeman-Walter-Abele test may additionally be relied upon in analyzing claims directed solely to a process for solving a mathematical algorithm."[xxxv] Although the Guidelines are devoid of a working definition of a mathematical algorithm as would have clearly defined any future use of this test, the intent of the Guidelines is clear: the two-step Walter-Freeman-Abele test was demoted.

The primary authorities were promoted. Relying on the language of § 101, the claimed invention must fall within one of the enumerated categories: process, machine, manufacture or composition.[xxxvi] Drawing on the primary authorities and in particular *Diehr*,[xxxvii] the USPTO prohibited patent protection of mere abstract ideas, laws of nature or natural phenomena. The invention must also satisfy the "usefulness" requirement of § 101 by having "real world value" or "a practical application within the 'technological arts'".[xxxviii] The Guidelines require the Examiner to review the entire disclosure in order to determine the presence of at least one practical application.[xxxix] Recognizing a nexus between the usefulness requirement and the three prohibited categories, the Guidelines state, "These three exclusions recognize that subject matter that is not a *practical application or use* of an idea, a law of nature or a natural phenomenon is not patentable."[xl]

III. The Federal Circuit Confirms the Practical Application Standard in *State Street* and *AT&T*

A. *State Street* Expanded the Statutory Standard to Include Programmed Computer Systems for Managing Financial Products

In *State Street Bank and Trust Co. v. Signature Financial Group, Inc.*,[xli] the Federal Circuit held that the computerized business-related invention protected by U.S. Patent No. 5,193,056, of Signature ("the Signature patent") is statutory. The Signature patent related to the management of mutual funds and, in particular, of such funds arranged in a "Hub and Spoke" configuration. This arrangement is a financial construct and, more specifically, an investment structure wherein a family of mutual funds (the Spokes) pool

their assets into an investment portfolio (the Hub), thereby realizing economies of scale from administrative costs and beneficial tax consequences. In particular, this system provides means for a daily allocation of assets for the Spokes that are invested in the Hub. The system determines the percentage share that each Spoke maintains in the Hub, while taking into consideration daily changes in both the value of the Hub's investment securities (gains and losses) and the Hub's daily income and expenses. Thus, the system could determine not only the entire value of a Spoke mutual fund but also the price of a share of that fund.[xlii]

Section 101 determinations focus on the invention recited in the claims and not that described in the specification. Thus, the first step of such a determination is to define the invention recited by the claim at issue. All of the claims of the Signature patent were claims reciting an apparatus and were drafted in terms of means for carrying out various functions. 35 U.S.C. § 112, 6th paragraph, permits the use of this type of claim format and requires that the structure corresponding to each means recitation in the claim be identified. As he had done in *Alappat,*[xliii] Judge Rich reproduced Financial Signature's claim 1 and, for each means recitation in that claim, set forth in brackets the corresponding structure that was disclosed in the written specification, as follows:

> 1. A data processing system for managing a financial services configuration of a portfolio established as a partnership, each partner being one of a plurality of funds, comprising:
>
> (a) computer processor means [a personal computer including a CPU] for processing data;
>
> (b) storage means [a data disk] for storing data on a storage medium;
>
> (c) first means [an arithmetic logic circuit configured to prepare the data disk to magnetically store selected data] for initializing the storage medium;
>
> (d) second means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on a specific input, allocate the results on a percentage basis, and store the output in a separate file] for processing data regarding assets in the portfolio and each of the funds from a previous day and data regarding increases or decreases in each of the funds, [sic, funds'] assets and for allocating the percentage share that each fund holds in the portfolio;
>
> (e) third means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on a specific input, allocate the results on a percentage basis, and store the output in a separate

file] for processing data regarding daily incremental income, expenses, and net realized gain or loss for the portfolio and for allocating such data among each fund;

(f) fourth means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on a specific input, allocate the results on a percentage basis, and store the output in a separate file] for processing data regarding daily net unrealized gain or loss for the portfolio and for allocating such data among each fund; and

(g) fifth means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate that information on an aggregate basis and store the output in a separate file] for processing data regarding aggregate year-end income, expenses, and capital gain or loss for the portfolio and each of the funds.[xliv]

As required by Section 112, paragraph 6, the scope of claim 1 included that bracketed structure, i.e., a personal computer, a data disk or an arithmetic logic circuit, and equivalents thereof.[xlv] Having so construed Claim 1, the Federal Circuit found a first basis for holding Claim 1 statutory, namely, that claim was drawn to specific structure and, thus, recited a machine.[xlvi] Thus the invention claimed in claim 1 fell within one of the four categories of patentable subject matter enumerated in § 101 and was, therefore, statutory.[xlvii] Whether this claim was a process or machine is of little relevance in a § 101 determination, as long as the claim falls within one of these four categories.[xlviii]

The *State Street* court could have concluded its opinion at this point. However, the Federal Circuit went on to state a second ground for its statutory holding, namely, that the claimed invention was applied to a practical application. State Street had challenged the Signature claims for failing the mathematical algorithm test. There is no argument that each of the second to fifth means of the Signature claim reproduced above recited a mathematical algorithm.

Dealing with the mathematical algorithm exception, the Federal Circuit stated that this exception is relevant as a § 101 standard only to the extent that a claim reciting a mathematical algorithm is merely an abstract idea.[xlix] In other words, a claim whose scope includes merely a mathematical algorithm is just an abstract idea.[l] Thus, in accord with *Diehr* and the Guidelines, the Federal Circuit held that neither a mathematical algorithm nor an abstract idea is patentable subject matter, unless (1) it produces a useful, concrete and tangible result, (2) it is applied in a useful way or (3) it is reduced to a practical application.[li]

In a quantum expansion of the subject matter deemed to be statutory, the Federal Circuit held that the system recited in Signature's claims was statutory, stating:

> [t]oday, we hold 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 of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result" -- a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.[lii]

Of similar import, the court concluded that, "claim 1 is directed to a machine programmed with the Hub and Spoke software and admittedly produces a 'useful, concrete, and tangible result' …. This renders it statutory subject matter, even if the useful result is expressed in numbers, such as price, profit, percentage, cost, or loss."[liii]

The preference of the *State Street* court for a practical application standard over the mathematical algorithm two-step test is clear. The Federal Circuit finds neither the first step of identifying a mathematical algorithm in a claim nor the second step of applying that algorithm to a physical element or process to be a useful indicator of whether a particular subject matter is an abstract idea or, conversely, whether it produces a useful result or is reduced to a practical application.[liv] For example, the mere processing of numbers did not render that subject matter nonstatutory, unless it produced no useful result or had no practical application.[lv] Rather, the Federal Circuit urged that the analysis was better focused on whether the claimed invention was (1) reduced to a practical application, (2) was applied in a useful way or (3) produced a useful, concrete and tangible result. In *State Street,* the useful result was the calculation of the share price of a particular mutual fund.

The Federal Circuit further held that a "Method of Doing Business" was not a further exception to the categories of statutory subject matter in addition to the three exceptions enumerated in *Diehr*. The method of doing business exception had been mentioned by the Federal Circuit in *In re Schrader* and by the CCPA in several of their decisions. Rather the court held that, "since the 1952 Patent Act, business methods have been, and should have been, subject to the same legal requirements for patentability as applied to any other process or method."[lvi]

B. *AT&T* Confirms that the Practical Application Test is the Dispositive Standard

AT&T v. Excel[lvii] is significant not because it expanded the scope of statutory matter, but rather for its affirmation of the usefulness criterion enunciated in *State Street* and for its clarification that the physical

transformation of subject matter was not the dispositive requirement of § 101. Claim 1 of the AT&T patent reads:

> 1. A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:
>
> (a) generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and
>
> (b) 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.[lviii]

The claimed invention used a primary interexchange carrier (PIC) to keep track of which of a plurality of interexchange carriers ("IXCs") of a telecommunication system that a long distance call is routed. The PIC identifies the particular IXC and is included within a message record, which is transmitted to a message accumulation system for processing and billing. The PIC permits a carrier to provide differential billing treatment to subscribers, depending on whether the subscriber calls someone with the same or a different IXC. The Federal Circuit held that the claimed invention "comfortably falls within the scope of § 101"[lix] based upon its analysis that" (t)he PIC indicator represents information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an IXC's subscriber."[lx]

The Federal Circuit dismissed Excel's argument based upon *Diehr*[lxi] that a claim reciting a mathematical algorithm is statutory only if there is a physical transformation of subject matter from one state to another.[lxii] A close reading of *Diehr*,[lxiii] according to the court, indicates that the recitation of a physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application."[lxiv] Rather, the Federal Circuit said that the "ultimate issue" is "whether the mathematical algorithm is applied in a practical manner to produce a useful result."[lxv]

IV. Examples of Statutory Computer-Related Inventions: From the "Safe Harbors" to the Cutting Edge

A. The USPTO Examination Flowchart

Included in the Guidelines is a flowchart entitled "Examination Procedures for Computer-Related Inventions" (Examination Flowchart) that shows the sequence of examination steps to which the USPTO subjects a computer-related invention. A copy of the Examination Flowchart is attached as an Appendix hereto. Each step is represented by a box and is explained in detail in a corresponding section of the Guidelines. The Examination Flowchart ties the steps together into a comprehensive examining process, which can be applied to a wide range of computer technology to determine whether it is statutory or not.

The first five boxes of the Examination Flowchart, which steps are to be performed with respect to all inventions, are: (1) read the specification and claims; (2) determine whether the disclosed invention has a practical application in the technological arts; (3) analyze the claims; (4) search the prior art; and (5) classify the claimed invention as statutory or non-statutory. Starting in box 6, the Examiner begins the § 101 determination of whether the invention is either statutory or nonstatutory. The following sections discuss the use of the Examination Flowchart in relation either to actual claims that were judged by the Supreme Court, the CCPA or the Federal Circuit or to claim examples that were prepared by the USPTO to train its Examiners.

B. Functional and Non-Functional Descriptive Material

Box 6 of the Examination Flowchart requires the classification of a computer-related invention as either "functional descriptive material", which might be deemed statutory after further analysis, or "non-functional descriptive material", which dispositively determines that the invention is nonstatutory. The Guidelines define functional descriptive materials as "data structures and computer programs which impart functionality when encoded on a computer-readable medium" and non-functional descriptive materials as including but not limited "to music, literary works and a compilation or mere arrangement of data."[lxvi] In turn, a footnote in the Guidelines defines "data structures" as "'a physical or logical relationship among data elements, designed to support specific data manipulation functions.' The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993)."[lxvii] On the other hand, mere data whose elements lack such physical or functional relationship are non-functional descriptive materials and are, therefore, nonstatutory.

A further dispositive criterion is whether either type of descriptive material is not claimed as embodied in a computer-readable medium, such as a memory. The Guidelines state, "Both types of 'descriptive material' are nonstatutory when claimed as descriptive material per se."[lxviii] The Guidelines explain as follows:

> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in

> most cases. When non-functional descriptive material is recorded on some computer-readable medium, it is not structurally and functionally interrelated to the medium but is merely carried by the medium. Merely claiming non-functional descriptive material stored in a computer readable medium does not make it statutory. Such a result would exalt form over substance. Thus, non-statutory music does not become statutory by merely recording it on a compact disk. Protection for this type of work is provided under the copyright law.[lxix]

The last issue to be resolved in box 6 is whether the invention is nothing more than the second nonstatutory category, i.e., a physical phenomenon as opposed to a practical application of that phenomenon. Relying on a Supreme Court decision, *O'Reilly v. Morse,*[lxx] the Guidelines clarify that "[c]laims that recite nothing but physical characteristics of a form of energy, such as frequency, voltage, or the strength of a magnetic field, are nonstatutory natural phenomena."[lxxi] Thus, if the Examiner determines that the claimed invention is either a data structure or computer program per se, non-functional descriptive material, or a natural phenomenon, box 7 concludes that the invention is nonstatutory.

Against this background, the next sections discuss certain USPTO claim examples that illustrate the difference between functional descriptive material and non-functional descriptive material.

1. USPTO Claim Example: Computer Product Claim

In this claim example, the specification disclosed data files containing a number of visual images stored in the memory of a computer and organized in such a manner to allow the user to retrieve the data more efficiently than was previously possible. The specification also disclosed that the disclosed organization is useful in many environments, specifically for computer-assisted hair styling and selection, by allowing the hair dresser to show client how the client's hair would look after the proposed styling is completed. The specification disclosed the use of specifically placed cameras and a computer to receive and process the information and store the views. The computer uses at least two view files to create an image on a display, and the applicant stated that the storage allows data to be manipulated quickly and easily to produce an image in real time on a laptop computer display. The specification also included a complete and proper disclosure with respect to the organization of the data in the memory and the manipulation of the data to produce the view.

The claim example reads as follows:

A computer memory product having stored thereon a digital data file, said memory product comprising:

a. a computer readable memory; and

b. a data file including:

1. at least two digital data portions;

2. a first digital data portion containing data representing visual images from a first location; and

3. a second digital portion containing data representing visual images from a second location wherein the second location is different from the first location.

According to the USPTO, this claim is not patentable. Although the invention has a practical application, i.e., it allows a hairdresser to show the client how a particular hairstyle would look on the client, the claimed invention recites data embodied on a computer-readable medium, which data does not impart functionality to either the data as claimed or to the computer. As such, the claimed invention recites non-functional descriptive material, i.e., mere data. In this case, non-functional descriptive material stored on a computer-readable medium is merely carried on the medium but is not structurally and functionally interrelated to the medium. According to the USPTO, allowance of such a claim would exalt form over substance.

However, amending the claim example by adding the following elements would, in the authors' opinion, make the claim statutory:

4. a third digital data portion containing scaleable data representative of a plurality of selectable hair styles; and

5. a fourth digital data portion comprising a program for receiving a particular hair style selected by a client and for combining the selected hair style and said first and second digital data portions to compose an image of the client with the client's hair styled in accordance with the selected hair style data.

The fourth digital data portion supplies the necessary functionality to the data as claimed by taking data that is merely stored on a computer and functionally acts on that data, i.e., to compose an image of the client with the selected hair style. Accordingly, these two elements convert the claimed invention from non-functional into functional descriptive material.

2. USPTO Claim Example: Data Modulated onto Carrier Signal

The next claim example provided by the USPTO expands the definition of a computer useable medium, most often implemented as a memory, to include an electrical signal. This claim example reads as follows:

A computer data signal embodied in a carrier wave comprising:

a. a compression source code segment comprising… [recites self-documenting source code]; and

b. an encryption source code segment comprising… [recites self-documenting source code].

In this example, the claimed invention recites specific software embodied on a computer-readable medium, i.e., specific software embodied in a carrier wave. Most likely, the "data signal" does not occur as a natural phenomenon. Therefore, absent objective evidence to support the position that the "data signal" is a natural phenomenon (the Examiner bears the burden of establishing this fact), such a position would be untenable.

The claim example above is an article of manufacture claim, and the claimed invention is a specific machine or manufacture because it recites specific software. The claim recites a computer program with two claim limitations: a specific source code segment for compression, and a specific source code segment for encryption. Reviewed as a whole, and given its broadest reasonable interpretation, the claim is limited to a specific article of manufacture. Also, the computer program is embodied on a computer-readable medium, i.e., the carrier wave. Thus, this claim is a statutory article of manufacture.

A significant use for this claim example is to protect data structures and programs that are transmitted over data lines, e.g., the internet. Presently, much software is marketed in the form of a disc that stores a program thereon. It is contemplated that marketing of such discs will become obsolete, when most software will be downloaded over a network directly to the buyer's computer. Similar data products may be so protected as long as they qualify as functional descriptive material.

C. Apparatus Claims for Specific Machines and Articles of Manufacture

Box 8 of the Examination Flowchart instructs the Examiner to determine whether the claim under analysis "requires one or more acts to be performed," i.e., whether the claim is a process or method claim.[lxxii] If the claim is not a process claim, the Examiner in box 9 determines whether the claim is a product or an apparatus claim, which would cover a machine or article of manufacture. If the claim is an apparatus claim, the Examiner determines in box 10 whether the "machine or manufacture claim [is] one of two types: (1) a claim that encompasses any and every machine for performing the underlying process or any and every

manufacture that can cause a computer to perform the underlying process, or (2) a claim that defines a specific machine or manufacture."[lxxiii] A claim of the first type is recognized as it would

> define the physical characteristics of a computer or computer component exclusively as functions or steps to be performed on or by a computer, and
>
> encompass any and every product in the stated class (e.g., computer, computer-readable memory) configured in any manner to perform that process.[lxxiv]

If the apparatus claim is found to recite any and every computer embodiment, this decision is not dispositive of whether or not the invention is statutory and merely shifts the burden to the applicant to demonstrate why the claimed invention is limited to a specific machine or manufacture. If the applicant fails to overcome this burden, the examination procedure continues to box 12, where the Examiner examines the underlying process.

According to the Guidelines, a claim limited to a specific machine or manufacture

> must define the physical structure of the machine or manufacture in terms of its hardware or hardware and "specific software." The applicant may define the physical structure of a programmed computer or its hardware or software components in any manner that can be clearly understood by a person skilled in the relevant art. Generally a claim drawn to a particular programmed computer should identify the elements of the computer and indicate how those elements are configured in either hardware or a combination of hardware and specific software.

If the structure of the hardware or the hardware and specific software is recited, then the claimed invention is concluded to be statutory in box 11.

35 U.S.C. § 112, ¶ 6 permits claims to be drafted in means- or steps-plus-function formats that permit such claims to recite an invention in terms of its functions without specifying its structure or its acts, and also determines the subject matter that such claims will be construed to cover. ¶ 6 of § 112 provides that:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claims shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The use of § 112, ¶ 6 to determine the scope of a claim requires two steps. The first step requires that each recitation of such a claim to be correlated to a particular portion of the supporting specification and

drawings of the patent or application under analysis and that the structure or acts described in that portion be identified. The second step requires an analysis of all equivalents of the identified structure or acts. As will be discussed below, claims drafted in such functional format have often been used to protect computer-related inventions due to the functional nature of such technology.

In keeping with ¶ 6, whether a claim, particularly one reciting a computer or software by means-plus-functional clauses, is drawn to a specific machine or manufacture depends in great part on whether the specification and drawings disclose specific hardware or a specific computer program.

1. USPTO Claim Example: Computer and Software Drawn to a "Specific Machine"

The following USPTO example clearly makes this point.

A computer read only memory for directing a word processing editing operation on the computer, said memory including:

a. means for specifying a start position of a character or character string to be highlighted on a display screen of the computer;

b. means for specifying an end position of the character or character string to be highlighted on the display screen;

c. means for selecting a color for the specific character or character string to be highlighted; and

d. means for modifying the character or character string specified by the specified start position and the specific end position with the selected color information for display.

In a first version, the supporting specification and drawings describe the invention in terms of a 486 PC that is programmed to make word processing edits in various colors. The only embodiment shown is a specific program listing of the program code, which is provided as an appendix to the written description. The written description also includes a high-level description of the invention and flowcharts showing specific steps of the program, which disclosure is, according to the specification, only for understanding the program listing.

The Guidelines state that this claim is statutory as a specific machine or manufacture, based on the disclosure of specific software and the interpretation of the means-plus-function clauses to cover the disclosed specific software, as required by § 112, ¶ 6. As stated above, ¶ 6 allows an element in a claim for a combination to be expressed in the form of "means-plus-function" language without the recitation of structure in

the claims, and such an element is construed to cover the corresponding structure or material described in the specification and equivalents thereof. In this case, each means clause is construed to cover a corresponding portion of the software code.

Contrast this outcome in the first version with that of the second, whose disclosure is essentially identical to that of the first except for the addition of the statement that "various other software can be employed to implement the functionality embodied in the high level description and flowcharts." Because of the presence of this alternative embodiment, the Guidelines concludes that the claimed invention is not confined to a specific machine or manufacture because of "the creation of alternate computer programs based on the high-level written descriptions and disclosed flow charts." Recalling that a "no" decision in box 8 is not dispositive as to whether this claim is statutory, the Examination Flowchart is carried on until box 13, which concludes that the claim is drawn to a practical application, i.e., "of performing edits in a word-processing system" and, by this further analysis, is statutory.

D. Safe Harbors: Pre- and Post-Computer Process Activities

The process recited by those method claims identified in box 8 of the Examination Flowchart and the underlying process carried out by the product claims that were identified in box 10 as not being directed to a specific machine or manufacture, are further examined in boxes 12 and 13. In these boxes, the Examiner asks whether the claimed process would either:

> (1) result in a physical transformation outside the computer for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan [box 12], or (2) be limited by the language in the claim to a practical application within the technological arts [box 13].[lxxv]

In box 12, the Examiner determines whether the steps of the process claims carry out physical transformations occurring outside the computer as opposed to inside the computer. Such outside-the-computer processes are deemed by the Guidelines to be the "Safe Harbors" of statutory inventions. Box 12 requires that the physical acts involve "the manipulation of tangible physical objects and result in the object having a different physical attribute or structure."[lxxvi] The physical acts or steps occurring outside the computer are characterized as either "post-computer process activity" if the physical steps occur "independent of and following the steps to be performed by a programmed computer" or "pre-computer process activity" if such physical steps are performed before the computer steps are executed.[lxxvii]

1. *Diamond v. Diehr*: Post-Computer Activity

In the Supreme Court case *Diamond v. Diehr,*[lxxviii] Diehr claimed an invention related to a "method of operating a rubber-molding press" by using the well-known Arrhenius equation to control the cure

time of synthetic rubber. Diehr's invention "continuously measure[d] the actual temperature in the closed press through the use of a thermocouple," and then using the instantaneous value of temperature in a known standard formula, calculated continuously the predicted time when the cure should be completed.[lxxix]

Claim 1 of Diehr reads as follows:

1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:

providing said computer with a data base for said press including at least, natural logarithm conversion data (ln), the activation energy constant (C) unique to each batch of said compound being molded, and a constant (x) dependent upon the geometry of the particular mold of the press,

initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,

constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is ln v = CZ+x where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and

opening the press automatically when a said comparison indicates equivalence.

The Guidelines identify Diehr's method of curing rubber in a mold as an example of such statutory processes having "post-computer process activity." The *Diehr* method used a computer to measure the temperature inside the mold, to calculate the cure time and, when the cure time had expired, to open the mold. The qualifying physical activity involved at least the opening of the mold but also, more significantly, a physical change, i.e., the curing, in the structure of the rubber. Thus, Diehr's claimed method of curing rubber readily fit within the Guideline's Safe Harbors of patentable subject matter.

Pre-computer process activity for a process typically involves collecting data for processing by a programmed computer. Whether or not such collecting and processing steps are statutory or not depend on whether that process

> requires the measurements of physical objects or activities to be transformed outside of the computer into computer data, where the data comprises signals corresponding to physical objects or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities.[lxxx]

2. *Arrhythmia*: Pre-Computer Activity

In this example based on the Federal Circuit's *Arrhythmia v. Corazonix*,[lxxxi] the invention was directed to the analysis of electrocardiograph signals from a heart patient in order to determine certain characteristics of the heart function. The specification disclosed a specific program and flowchart steps for selecting the QRS segment of the electrocardio-graph signals, converting them from analog to digital, and obtaining a composite digital representation of the QRS segment by selecting and averaging a large number of the patient's QRS waveforms. The anterior portion of the composite QRS waveform is then isolated and processed in reverse time so as to ascertain whether the patient is in high risk of heart failure.

The *Arrhythmia* claim example is as follows:

A method for analyzing electrocardiograph signals to determine the presence or absence of a predetermined level of high frequency energy in the late QRS signal, comprising the steps of:

a. converting a series of QRS signals to time segments, each segment having a digital value equivalent to the analog value of said signals at said time;

b. applying a portion of said time signals in reverse time order to a high pass filter; determining an arithmetic value of the amplitude of the output of said filter; and

c. comparing said arithmetic value with said predetermined level.

As explained in the Guidelines, this claim is patentable because it contains a practical application in the technological arts and because it contains a pre-computer process activity. The practical application is stated as the determination of whether or not a patient has a high risk of suffering heart failure, and the pre-computer process activity occurs when the QRS signal is converted to a digital electrical signal. The signal represents a physical activity, namely, the patient's heart activity.

E. Practical Application: The Dispositive Test

If the process does not fit within the safe harbors of statutory pre- or post-computer process activity, the § 101 examination is not yet concluded but continues in box 13. Box 13 focuses on those steps occurring inside the computer, i.e., in-computer process activity. The presence of such in-computer process activity is not dispositive of whether or not the process is statutory. Rather, the statutory character of such activity depends "not [on] how the computer performs the process, but what the computer does to achieve a practical application."[lxxxii]

The requirement made by the Guidelines that claims drawn to in-computer activity were required to recite positively a practical application in the technological arts whereas claims drawn to pre- or post-computer processes were not, has now been discarded.[lxxxiii] Even so, it is good practice to draft the claims as well as the specification to include a clear indication that the invention relates to a practical application.

According to the Guidelines, such in-computer process activity that

> merely manipulates an abstract idea or performs a purely mathematical algorithm is nonstatutory despite the fact that it might inherently have some usefulness. For such subject matter to be statutory, the claimed process must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts.[lxxxiv]

According to the Guidelines, even a process claim drawn to in-computer process activity involving abstract ideas or mathematical algorithms might be determined to be statutory in box 13, if the process claim is limited to a practical application in the technological arts.

Thus, whether or not a process claim effectively recites a physical transformation outside a computer to render it statutory or effectively recites the in-computer process as one relating to a practical application in the technological arts are close questions dependent upon how the claim and the supporting specification are drafted. The following USPTO and court claim examples illustrate the impact of a clearly disclosed practical application on the allowability of a claim.

1. USPTO Claim Example: Sale of Mutual Funds.

In this example, the invention is directed to a computerized method of evaluating investment risk factors between a plurality of mutual funds and optimizing an investment value to be distributed among the funds. The specification recites no specific hardware and no computer listing but does provide high level flow diagrams, descriptions of the desired functionality, and numerous detailed formulas to calculate risk factors,

distribution amounts, time periods, performance data on past transactions etc. The specification also indicates that communication between the investor and a broker/fund manager takes place through the computer system.

The method involves storing in the computer memory data representing various mutual funds (identifiers), risk ranking factors for each fund, and individual investor profiles. An investor specifies a dollar amount to be invested, and the computer then calculates the optimal disbursement of the allocation between various funds to meet the investor profile previously established. The disclosure presents several embodiments which act to either advise the investor on possible investment strategies, prepare a report of investment strategies to be incorporated into a monthly investor account summary, or control an automated scheme to buy and sell shares of mutual funds in order to invest according to the optimized profile.

The claim example provided by the USPTO is:

A computerized method of allocating funds for a mutual fund among a plurality of funds in a group, comprising the steps of:

a. receiving at least one fund identifier for each of said plurality of funds;

b. receiving at least one risk ranking factor for each of said plurality of funds;

c. receiving at least one set of allocation parameters which correspond to the desired allocation of funds relative to a profile of said ranking factors;

d. storing the fund identifiers, the risk ranking factors and the allocation parameters on a computer readable medium;

e. receiving an initial investment value which is to be invested in the funds;

f. receiving an incremental investment allotment value and a period for the incremental investment allotment value;

g. receiving an indication of allowable level of investor risk; and

h. using the stored fund identifiers, the risk ranking factors and the allocation parameters in combination with the initial investment value, the incremental investment allotment value, the period for the incremental investment allotment value, and the indication of allowable level of investor risk to provide an optimum account allocation between the funds in the group.

The USPTO considers that the claimed invention is not statutory because it is not limited to a practical application. The claimed invention merely describes the mathematical operations used in the funds

system to calculate an optimum account allocation for the funds in the mutual funds but does not actually optimally allocate the funds, i.e., a practical application. This interpretation is based upon the finding that step (h) is not a step-plus-function limitation under 35 U.S.C. § 112, ¶ 6. The failure of the claim to positively recite a data allocation step to allocate the data in the optimum way, i.e., the practical application of the mathematical algorithm, is the reason why the requisite functionality (to achieve the practical application) has not been realized.

However, the USPTO adds step recitations to the above claim example in two depending claims, whereby it is rendered statutory. The first dependent claim reads:

> The method of claim 1, further including the step of displaying the optimum account allocation on an investor monthly account summary report to an investor or broker.

This first dependent claim is limited to the practical application of preparing and displaying the summary report to an investor or broker. A summary report has real world value and provides immediate benefit. The claimed invention is also limited to the practical application of displaying the optimal account allocation to the investor. The specification discloses three embodiments, two of which "advise" the investor of possible investment strategies. The investment strategies are based on the calculated optimal account allocation. Thus, given its broadest reasonable interpretation in light of the specification, displaying the optimal account allocation to the investor is more than the mere output of the calculation because the display must be provided in a format which "advises" the investor of possible investment strategies, i.e., has real world value and immediate benefit.

The second dependent claim reads:

> The method of claim 1, further including the step of transferring funds between the mutual funds in the group according to the optimum account allocation.

This second dependent claim is also limited to the practical application of transferring the funds between a plurality of mutual funds in accordance with the optimal account allocation. The funds transfer is an optimal allocation of the data to impart the required functionality to achieve a practical application.

2. USPTO Claim Example: Matrix Multiplication

In this example, the specification discloses a method of performing matrix multiplication using a general purpose computer. No specific computer hardware or software programs are disclosed. The specification recites specific algorithms for manipulating matrices including the multiplication of two matrices together. A flow chart showing the steps involved in creating the rows and columns of the matrix and the

multiplication of the terms is provided. The terms of the matrix are disclosed as representing vectors, which could represent data collected from real world objects or could be abstractions of non-physical systems.

The method consists of creating two matrices having terms defined by disclosed mathematical relationships such as being non-zero, and related to a prime number or a factorial of a prime number. After the two matrices are created, they are combined into one matrix by interleaving rows and columns until a prescribed mathematical relationship exists. A multiplication of the matrixes then takes place whereby an output result is determined which defines the value(s) for some unknown quantity.

The disclosure provides several examples of possible uses for the method which include simulation of space craft flight paths. The specification mentions that if this method were incorporated into the control environment of a space craft, the pilot could use the method to optimize flight paths. No details of how this would be done are recited in the specification, although the disclosure complies with the requirements of 35 U.S.C. § 112. The disclosure states that the invention is not limited to the space craft environment.

This claim example, with the USPTO's underlined additions to be discussed below, reads:

A processing system for modeling space craft thruster operation to aid pilots in control of the vehicle by performing a plurality of matrix manipulations of terms representing thrust vectors comprising:

a. means for creating a first R-row by C-column sub matrix of yaw vector components consisting of an offset diagonal of non-zero terms, each of the R-rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;

b. means for creating a second R-row by C-column sub matrix of pitch vector components consisting of an offset diagonal of non-zero terms, each of the R rows having at least N non-zero terms equal in number to C, where C is a prime number and the sum of the non-zero terms of each row is less than C!;

c. means for sequentially manipulating the two sub matrices in a manner such that each matrix interleavedly exchanges a row and column until 2R-C exchanges have been made;

d. means for matrix multiplying the manipulated matrices; and

e. means for outputting the result.

According to the USPTO, the claimed invention, not including the underlined recitations, is not limited to a practical application. Viewed as a whole, the claimed invention merely multiplies the matrices and outputs the direct result. It does not impart any function to the processing system, i. e., the claimed

invention is not practically applied. Instead, the claimed invention merely describes the mathematical operations being performed in the system.

The USPTO would reach an opposite conclusion if the above claim were amended to include the above underlined recitations and to replace step e with the following amended step e':

e'. means for outputting the result which simulates space craft operation in the yaw and pitch plane of flight.

In this case, the amended claim is limited to the practical application of simulating space craft operation in the yaw and pitch plane of flight. The preamble of the claim states that the "processing system" is "for modeling space craft thruster operation." Thus, the "which simulates" clause of element e (means for outputting) is not a statement of intended use but rather limits the claim to the practical application of modeling space craft thruster operation in the yaw and pitch plane of flight.

3. USPTO Claim Example: Training a Neural Network

In this example, the specification discloses a method of training a neural network node using a general purpose computer that contains a CPU and a math coprocessor. The computer has a standard operating system and configuration for memory having a number of interconnected memory cells each working together. The method consists of a sequence of functions being carried out in a specific order so as to achieve the functionality of training this specialized network to perform a wide range of varied functions. The method of training a neural network node contains a number of basic steps, the first of which is a step of providing an initial set of target points in the model space. After the set of target points is set, an estimate of the probability density function (PDF) on the model space at each node in the model space is generated, and a second set of target points in that model space is then determined. The second set of target points are individually or combinatorially evaluated using the probability density function PDF.

For optimum training within a system, a threshold value must be selected for the desired functionality. The threshold value is determined to be less than PDF(i) , where i is the ith target point for each of the second set of target points. Using this threshold value, a first training set of target points for the model space is computed using the N.N.S. (Neural Network Standard determined by National Institute for Standards and Technology in 1995), where the input value is selected and the output value is the PDF(Input value) where PDF(Input value) is less than the threshold value. Once the first and second set of training sets are determined to meet the criteria set forth above, these sets now contain the desired characteristics to appropriately train the neural network for the desired functionality.

There are a wide range of functions which may be carried out by the ultimate end user of the neural network. The function will dictate the criteria upon which the network specifications must be established, and the process will vary based upon the selection of the criteria. The disclosed methodology is the basic framework from which most functionalities may be established from an appropriate training set.

The neural networks to be trained may be based either in an adapted hardware system or on a general purpose computer to carry out the desired functionality as a neural network. The training may be done either by a technician, by automated system or by a programmed system in the general purpose computer.

The USPTO provides the following claim example:

A computerized method of training a neural network node comprising the steps of:

a. providing an initial set of target points;

b. providing a second set of target points;

c. determining a threshold value that is less than a predetermined value;

d. using the threshold value, providing a first training set of target points;

e. using the threshold value, providing a second training set of target points; and

f. using the first and second sets of training target points to train the neural network.

According to the USPTO, the claimed invention does have a practical application in that it trains a neural network. The step of training the neural network is a functional step that covers reconfiguration of the neural network to produce a practical effect, i.e., to permit the network to perform a desires set of functions.

The USPTO would come to the opposite conclusion if recitation f was replaced with the following recitation:

f.' using the first and second sets of training target points to develop a set of training sets for training the neural network.

In this case, the USPTO stated that the amended claim was not limited to a practical application. Viewed as a whole, the claimed invention is the abstract idea of using a computer system to mathematically develop training sets for training neural networks. The “for training the neural network” clause of step f' (using … to develop) is a statement of intended use. Thus amended step f' does not train the network, i.e., a practical application. The amended claim is directed to nothing more than converting one set of numbers to another set of numbers with no practical effect.

4. USPTO Claim Example: Determine Risk of Certain Securities.

In this example, the invention is a method of determining whether to extend real estate services to a potential customer. The method is performed utilizing a general purpose computer system configured for that purpose, i.e., specific inputs for receiving data, ALUs, outputs, etc. for implementing the method.

The method includes a series of steps to be performed on a computer system for providing real time indications of whether to extend real estate services such as insurance, second mortgages, lines of credit, etc. based upon the potential customer's ownership of specified securities. The computer system receives data relating to the value of the specified securities, market variations/changes with respect to those securities, and a potential range of acceptable future values for those securities. Employing this data, the computer system determines the probable value of those securities at a time in the future to assess the risk of extending a home mortgage service or other real estate related service to the potential customer who is the owner of the securities. The assessment is made by comparing a determined level of risk for extending the service with a threshold value for that risk. The outcome of the evaluation and the resulting decision on the real estate related service are conveyed to the potential customer.

The disclosed invention includes a preferred embodiment in specific hardware/software but also includes high level flow charts that could be used to implement the method in "any and every" product. The notification to the potential customer is disclosed as including the preparation of a "form letter" of acceptance/rejection; but further includes a general statement that "any other appropriate means" could be used. The "form letter" can be prepared by the computer system-printer output or prepared by a person.

The USPTO provides the following claim example:

In a system for real time determination of a market indicator for securities which mature within a set time, the system comprising:

a. means for receiving data relating to investor investment in specific securities;

b. means for receiving data relating to market transactions of the securities;

c. means for evaluating the received market transaction data to determine which of the received market transaction data is within a preset range of values;

d. means for selecting the received market transaction data determined to be within the preset range; and

e. means for evaluating the data relating to investor investment in specified securities and the selected data to determine the probable value of the securities for a range of time in the future;

the method of determining the level of risk in extending a real estate service comprising the steps of:

f. evaluating the investor investment in specified securities data and the probable value of the securities to determine the level of risk for a home mortgage service; and

g. using the level of risk determined for the home mortgage service to determine a level of risk for a related real estate service.

The USPTO does not believe that the above-claimed invention is limited to a practical application. Viewed as a whole, the claimed invention is the abstract idea of using a computer system to mathematically determine risk levels for extending real estate services. It does not extend real estate services -- a practical application. The claimed invention merely performs calculations and outputs the direct result.

The USPTO would not change its conclusion that the above claim is nonstatutory even if it is amended to include the further recitations:

h. comparing the level of risk determined for the related real estate service with a threshold value;

i. determining whether to extend the related real estate service based upon the comparison with the threshold value, and

j. notifying a potential buyer of the decision on whether to extend the related real estate service.

In this instance, the USPTO still considers that the amended claim is not limited to a practical application. The specification discloses that "notification" includes the preparation of an acceptance or rejection "form" letter or "other appropriate means" by either the computer or a person. Thus, given its broadest reasonable interpretation, the step of "notifying a potential buyer of the decision" is not limited to a "form" letter -- a practical application. Instead, it includes "other appropriate means" including merely outputting the direct result of the calculation.

5. Claim Example: Schrader's Method of Conducting an Auction

Both *In re Schrader*[lxxxv] and *State Street*[lxxxvi] dealt with methods of doing business whose similarity makes it difficult to reconcile the opposite holdings of the *State Street* court that its invention was

statutory and of the *Schrader* court that its invention was not. *Schrader* and *State Street* dealt respectively with the manipulation of bids at an auction, and with the final share price, percentage, cost, loss or profit of a family of mutual funds.

In *Schrader*, the invention related to the auctioning of a plurality of items such as tracks of land. A bid could be placed for a single item or for any combination of the items. The court gave a simplified example of the invention, wherein there were only two tracts of land, track 1 and tract 2, and only 3 bidders. In this example, "the following bids might be received and recorded. Bid 1 -- $100,000 for tract 1 by bidder A; Bid 2 -- $200,000 for tract 2 by bidder B; and Bid 3 -- $250,000 for both tracts 1 and 2 by bidder 3."[lxxxvii] Each combination of bids that includes bids for all of the tracts, termed a "completion," is assembled, and all of the bid prices in a completion are summed to provide a total price of that completion. The total prices for all of the completions are ranked, and bidders associated with the completion with highest total are designated the winners. In the court's example, a first completion consisted of Bids 1 and 2, and the second completion only of Bid 3. The total price of $300,000 of the first completion was greater than the $250,00 total of the second completion, and thus was the winning completion that maximized the revenue to the seller.

Claim 1 of *Schrader* reads:

1. A method of competitively bidding on a plurality of items comprising the steps of:

identifying a plurality of related items in a record,

offering said plurality of items to a plurality of potential bidders,

receiving bids from said bidders for both individual ones of said items and a plurality of groups of said items, each of said groups including one or more of said items, said items and groups being any number of all of said individual ones and all of the possible combinations of said items,

entering said bids in said record,

indexing each of said bids to one of said individual ones or said groups of said items,

assembling a completion of all said bids on said items and groups, said completion identifying a bid for all of said items at a prevailing total price, [and]

identifying in said record all of said bids corresponding to said prevailing total price.

The *Schrader* court held that claim 1 did not recite statutory subject matter, stating:

[T]here is nothing physical about bids per se. Thus, the grouping or regrouping of bids cannot constitute a physical change, effect or result. The only physical effect or result

> which is *required* by the claim is the entering of bids in a "record," a step that can be accomplished simply by writing the bids on a piece of paper or a chalkboard.[lxxxviii]

The *State Street* court attempted to distinguish *Schrader* by stating that that decision "turned on the fact that the claims implicitly recited an abstract idea in the form of a mathematical algorithm and there was no 'transformation or conversion of subject matter representative of or constituting physical activity or objects.'[lxxxix] The *AT&T* court criticized by name the *Schrader* court and by implication the *State Street* court for its reliance on the lack of a "physical transformation" rationale, stating:

> [t]he focus of the court in *Schrader* was not on whether the mathematical algorithm was applied in a practical manner since it ended its inquiry before looking to see if a useful concrete, tangible result ensued. Thus, in light of our most recent understanding of the issue, the *Schrader* court's analysis is … unhelpful ….[xc]

While criticizing the *Schrader* court for not applying the practical application test, the *AT&T* court also failed to perform such an analysis of the Schrader claims. At first glance, Schrader's auction method would appear to have a practical application similar to that relied on in *State Street,* i.e., the determination of the price of a share of mutual fund in *State Street* and the best price for the tracts of land in *Schrader*.

The rationale of the USPTO in the previously discussed analysis of the Mutual Fund Claim Example may be applied to the *Schrader* invention. The USPTO concluded that this claim example did not positively claim "the requisite functionality (to achieve the practical application)" and, thus, was deemed nonstatutory for lack of a practical application. As required by the Federal Circuit and the Guidelines, the *Schrader* claim needs to be reviewed as a whole to determine whether the functionality necessary to achieve the contemplated practical application is positively recited. In particular, the steps required to determine which completion will realize the greatest revenue are not recited in claim 1. Schrader's claim 1 requires that only one completion be assembled. The auction process so recited would not be able to determine an optimum or highest total price for all of the items offered for sale at the auction. To be able to achieve that practical application, the method would need to include the further steps of assembling at least two completions and of ranking the total prices of the two completions in order to determine which is greater and, thus, the completion that maximizes the profit to the seller. Although the above analysis reaches the same conclusion as did the *Schrader* Court, *i.e.*, the Schrader auction is nonstatutory, it does so by focusing on the intended practical application as urged by the *AT&T* court.

V. Conclusion

Based upon the recent decisions by the Federal Circuit and the Guidelines and claim examples promulgated by the USPTO, as outlined above, it appears that there has developed a new standard for determining whether or not a claim for a computer-related invention is statutory. This new test is based on the presence in the claim of a practical application for the computer-related activity, whether this activity takes place inside the computer or outside the computer. This "practical application" test has been used in the most recent Federal Circuit decisions on § 101 and appears to also be used by the USPTO in several claim examples relating to in-computer process activity, almost as superseding boxes 6-13 of the Examination Flowchart. As discussed above, this test examines the claim to determine whether the in-computer activity has a practical application that would allow the claim to be considered within the statutory safe harbors.

As a practical matter, for a patent attorney who desires to prepare claims for examination by the USPTO, it appears to be fairly straightforward to modify claims that cover in-computer activity so that the claims would be statutory. This is done preferably by reciting within the claim a practical application for the in-computer process activity. For example, even though the Examination Flowchart published by the USPTO does not now state that it is necessary to recite a practical application within the claim, recent experience, including Federal Circuit cases and USPTO claim examples discussed above, show that it is strongly suggested that this be done if the claim is to be considered within § 101. Moreover, and most importantly, it is crucial that the patent specification clearly describe the practical application that is accomplished by the computer invention.

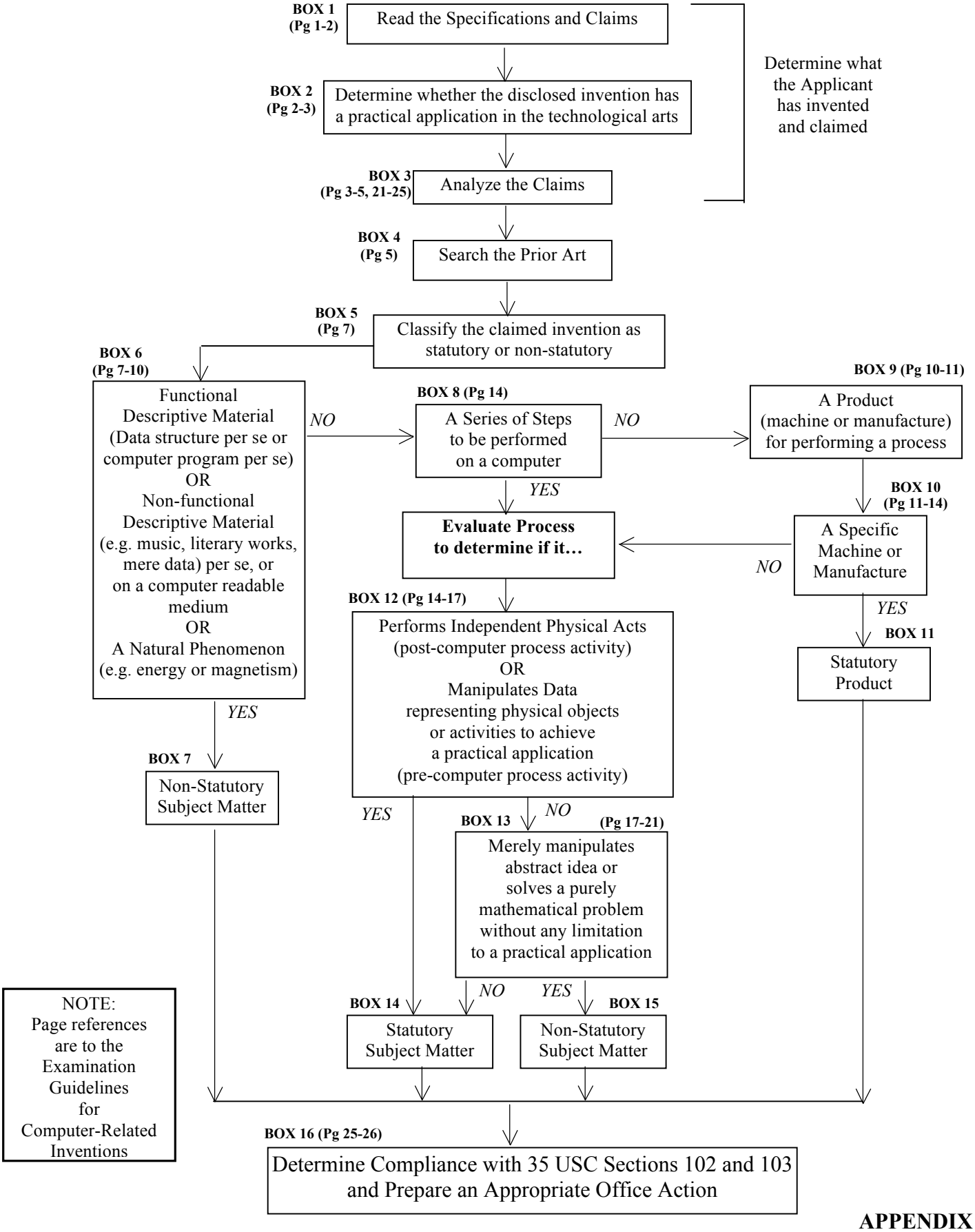
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[i] 50 USPQ2d 1447 (Fed. Cir. 1999).
[ii] *See, e.g.,* 33 Fed. Reg. 15581, 15609-10 (1968).
[iii] 573 F.2d 1237, 197 USQP 464 (CCPA 1978).
[iv] 618 F.2d 758, 205 USPQ 397 (CCPA 1980).
[v] 684 F.2d 902, 214 USPQ 682 (CCPA 1982).
[vi] 33 F.3d 1526, 31 USPQ 2d 1545 (Fed. Cir. 1994) (*en banc*).
[vii] 573 F.2d 1237, 197 USQP 464 (CCPA 1978).
[viii] 573 F.2d at 1245, 197 USPQ at 471.
[ix] 688 F.2d 789, 215 USPQ 193 (CCPA 1982).
[x] 688 F.2d at 796, 215 USPQ at 198.
[xi] 958 F.2d 1053, 22 USPQ 2d 1033 (Fed. Cir. 1992).
[xii] 58 F.2d at 1059-60, 22 USPQ 2d at 1038.
[xiii] 958 F.2d at 1061, 22 USPQ 2d at 1040 (Rader, J., concurring).
[xiv] *Gottschalk v. Benson*, 409 U.S. 63, 175 USPQ 673 (1972).
[xv] *Parker v. Flook*, 437 U.S. 584, 198 USPQ 193 91978).
[xvi] *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981).
[xvii] 958 F.2d at 1065, 22 USPQ 2d at 1043 (quoting *Diehr*, 450 U.S. at 185, 209 USPQ at 7).
[xviii] 33 F.3d 1526, 31 USPQ 2d 1545 (Fed. Cir. 1994) (*en banc*).
[xix] *Gottschalk v. Benson*, 409 U.S. 63, 175 USPQ 673 (1972).
[xx] *Parker v. Flook*, 437 U.S. 584, 198 USPQ 193 (1978).
[xxi] *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981).
[xxii] 450 U.S. at 185, 209 USPQ at 7.
[xxiii] 450 U.S. at 187, 209 USPQ at 8.

[xxiv] 450 U.S. at 188, 209 USPQ at 9.
[xxv] 450 U.S. at 184, 209 USPQ at 7.
[xxvi] 33 F.2d at 1542, 31 USPQ 2d at 1556.
[xxvii] 33 F.2d at 1542, 31 USPQ at 1556 (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980)).
[xxviii] 33 F.3d at 1542-43, 31 USPQ 2d at 1556.
[xxix] 33 F.3d at 1543, 31 USPQ 2d at 1557.
[xxx] 33 F.3d at 1543, 31 USPQ 2d at 1556, n.19.
[xxxi] 33 F.3d at 1543, 31 USPQ 2d at 1556-67.
[xxxii] 1184 O.G. 87 (1996).
[xxxiii] A copy of this flowchart is attached as an Appendix.
[xxxiv] Access to the Guidelines and to the most recent version of the claim examples is via the PTO's website at http://www.uspto.gov.
[xxxv] 1184 O.G. 87, 87 (1996).
[xxxvi] *Id.*
[xxxvii] *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981).
[xxxviii] 1184 O.G. at 87.
[xxxix] *Id.* at 88.
[xl] *Id.* at 89.
[xli] 149 F.3d 1368, 47 USPQ 2d 1596 (Fed. Cir. 1998), *cert. denied,* 119 S.Ct. 851 (1999).
[xlii] 149 F.3d at 1371, 47 USPQ 2d at 1598.
[xliii] 33 F.3d 1526, 31 USPQ 2d 1545 (Fed. Cir. 1994).
[xliv] 149 F.3d at 1371, 47 USPQ 2d at 1599.
[xlv] 149 F.3d at 1371, 47 USPQ 2d at 1599.
[xlvi] 149 F.3d at 1372, 47 USPQ 2d at 1599.
[xlvii] 149 F.3d at 1372, 47 USPQ 2d at 1600.
[xlviii] 149 F.2d a5 1372, 47 USPQ 2d at 1600.
[xlix] 149 F.3d at 1372, 47 USPQ 2d at 1602.
[l] 149 F.3d at 1372, 47 USPQ 2d at 1602.
[li] 149 F.3d at 1373, 47 USPQ 2d at 1601.
[lii] 149 F.3d at 1373, 47 USPQ 2d at 1601.
[liii] 149 F.3d at 1375, 47 USPQ 2d at 1602.
[liv] 149 F.3d at 1374, 47 USPQ 2d at 1601.
[lv] 149 F.3d at 1374, 47 USPQ 2d at 1601.
[lvi] 149 F.3d at 1375, 47 USPQ 2d at 1602.
[lvii] 50 USPQ2d 1447 (Fed. Cir. 1999), cert. denied, 120 S.Ct. 368 (1999).
[lviii] 50 USPQ2d at 1449.
[lix] 50 USPQ2d at 1452.
[lx] 50 USPQ2d at 1452.
[lxi] 450 U.S. at 184.
[lxii] 50 USPQ2d at 1452.
[lxiii] *See* 450 U.S., at 192.
[lxiv] 50 USPQ2d at 1452.
[lxv] 50 USPQ2d 1453.
[lxvi] 1184 O.G. at 89.
[lxvii] *Id.* at 96, n. 27.
[lxviii] 1184 O.G. at 89.
[lxix] *Id.*
[lxx] 56 U.S. 62 (1854).
[lxxi] 1184 O.G. at 90.
[lxxii] 1184 O.G. at 91.
[lxxiii] *Id.* at 90.
[lxxiv] *Id.*
[lxxv] 1184 O.G. at 91 (bracketed material added).
[lxxvi] *Id.*
[lxxvii] *Id.*

[lxxviii] 450 U.S. 175, 209 USPQ 1 (1981).
[lxxix] 450 U.S. at 179, 209 USPQ at 5.
[lxxx] 1184 O.G. at 92.
[lxxxi] 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992).
[lxxxii] 1194 O.G. at 91.
[lxxxiii] 1194 O.G. at 91.
[lxxxiv] *Id.* at 92.
[lxxxv] 22 F.3d 290, 30 USPQ2d 1455 (Fed. Cir. 1994).
[lxxxvi] 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998).
[lxxxvii] 22 F.2d at 291.
[lxxxviii] 22 F.3d at 293-94, 30 USPQ2d at 1458.
[lxxxix] 149 F.3d at 1376, 47 USPQ2d at 1603.
[xc] 50 USPQ2d at 1453.

EXAMINATION PROCEDURES FOR COMPUTER-RELATED INVENTIONS



APPENDIX