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Keeping it Physical: Convergence on a Physicality Requirement for Patentability of Software-Related Inventions Under the European Patent Convention and United States Law

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KEEPING IT PHYSICAL: CONVERGENCE ON A PHYSICALITY REQUIREMENT FOR PATENTABILITY OF SOFTWARE-RELATED INVENTIONS UNDER THE EUROPEAN PATENT CONVENTION AND UNITED STATES LAW

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I. THE MOVEMENT OF BOTH THE EUROPEAN PATENT OFFICE AND THE UNITED STATES PATENT AND TRADEMARK OFFICE TOWARD A PHYSICALITY REQUIREMENT FOR SOFTWARE-RELATED INVENTIONS

The increasing influence of computers on the modern world has led to a growing number of innovations in the area of computers, including software. As a result, applications for software-related patents have increased over the past few decades.[1] This surge of software-related patent applications has forced the European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO) to address whether inventions related to software are patentable subject matter. Each entity has adapted to the increasing acceptance of software-related patents over time, as is exemplified by the case law before the Boards of Appeal of the European Patent Office (Board) and U.S. courts. Furthermore, in light of recent case law, a common thread exists in the current approaches in Europe and the United States: The presence of a physical hardware element in the claimed software-related invention will usually be sufficient to fulfill the patentable subject matter requirement before both the Board and U.S. courts. Thus, although differences still exist between the two approaches, case law in Europe and in the United States has effectively converged upon a physicality requirement.

This Article surveys the approaches to determining the patentability of software-related inventions taken under the European Patent Convention and in the United States. Regarding the European approach, recent cases before the Board will be surveyed and common themes, including the physicality requirement, will be identified. Regarding the American approach, the evolution of case law regarding 35 U.S.C. § 101 will be traced by analyzing important cases over the last three decades, which have seen rapid changes in the area of software-related inventions. The USPTO's interpretation of these cases will also be discussed in relation to the USPTO's *Examination Guidelines for Computer-Related Inventions*. Finally, the European and American approaches will then be compared and contrasted, revealing a general convergence of both jurisdictions on a physicality requirement for the patentability of software-related inventions.

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[1] *See* David S. Evans & Bernard J. Reddy, *Government Preferences for Promoting Open-Source Software: A Solution in Search of a Problem*, 9 MICH. TELECOMM. & TECH. L. REV. 313, 321 (2003) ("The number of software patents awarded annually to U.S. inventors has increased from 829 in 1986 to 7398 in 2000.").

A. ALTHOUGH THE EUROPEAN PATENT CONVENTION EXCLUDES "COMPUTER PROGRAMS" AS NON-PATENTABLE SUBJECT MATTER, RECENT CASES INDICATE THAT SOFTWARE-RELATED CLAIMS MAY BE PATENTED SO LONG AS THEY CONTAIN PHYSICAL HARDWARE FEATURES

From a superficial level, one might easily get the impression that software-related patents, and software in particular, are barred from patentability under the European Patent Convention (EPC). After all, Article 52 of the EPC, which governs patentability, provides as follows:

> (1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.
> (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:
> (a) discoveries, scientific theories and mathematical methods;
> (b) aesthetic creations;
> (c) schemes, rules and methods for performing mental acts, playing games or doing business, and *programs for computers*;
> (d) presentations of information.
> (3) The provisions of paragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.[2]

However, despite this somewhat conclusory prohibition against the patentability of "programs for computers,"[3] recent decisions by the Board have accepted the patentability of software-related inventions.

1. The Patentability of Software-Related Inventions under EPC Article 52. Before surveying the individual decisions by the Board that indicate acceptance of software-related inventions, a general overview of decisions from the Board regarding the patentability of software-related inventions under Article 52 is in order. Generally, under Article 52, claimed subject matter must fulfill four requirements to be entitled to a patent.[4] Specifically, the claimed subject matter

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[2] Convention on the Grant of European Patents (European Patent Convention) art. 52, Oct. 5, 1973, 1065 U.N.T.S. 255, 271–72 [hereinafter EPC] (emphasis added).

[3] *Id.*

[4] Estimating sales activity/DUNS LICENSING ASSOCIATES (*Duns Licensing*), Decision T 0154/04-3.5.01, 17–18 (Tech. Bd. App. Nov. 15, 2006), *available at* http://legal.european-patent-office.org/dg3/pdf/t040154ex1.pdf; Auction method/HITACHI (*Auction Method*), Decision T 0258/03, 12/2004 O.J. E.P.O. 575, 580 (Tech. Bd. App. 2004), *available at* http://www.european-

must be an "invention," and the invention must be new, inventive, and industrially applicable.[5] The patentability of claimed subject matters turns on whether the claimed subject matter is an "invention," as defined by Article 52.[6] An "invention" is subject matter having technical character.[7]

Paragraph (2) of Article 52 is a negative, non-exhaustive list of what should not be regarded as an invention within the meaning of Article 52(1).[8] Paragraph (3) of Article 52 was introduced as a bar to a broad interpretation of Article 52(2).[9] Thus, the list of excluded subjects in Article 52(2) should not be given too broad a scope of application.[10] In addition, although Article 52(2) excludes "programs for computers" as such, the claim category of a computer-implemented method is distinguished from a computer program; thus, a computer-implemented method is not excluded, as such, from patentability under Article 52(2).[11]

The determination as to whether claimed subject matter is an invention is a prerequisite to examination of the claimed subject matter with respect to novelty, inventive step, and industrial application.[12] Furthermore, the determination as to whether claimed subject matter is an invention, including whether the claimed subject matter is excluded under Article 52(2), is made without considering the prior art, and uses a broad interpretation of the term "invention."[13] A claim that includes both technical and non-technical features may be an invention and, therefore, may be patentable under Article 52.[14] The aforementioned rules have been applied in the cases of the Board described below in Part I.A.*2*.

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patent-office.org/epo/pubs/oj004/12_04/12_5754.pdf.

[5] *Duns Licensing*, *supra* note 4, at 17–18; *Auction Method*, *supra* note 4, at 580.

[6] *See Auction Method*, *supra* note 4, at 580–81 (explaining that verification that the claimed subject matter is an invention within the meaning of Article 52(1) is a prerequisite for the examination of the other three patentability criteria).

[7] *Id.*; *Duns Licensing*, *supra* note 4, at 18, 23–25.

[8] *Duns Licensing*, *supra* note 4, at 20.

[9] *Id.* at 20–21.

[10] *Id.*

[11] *See* Clipboard Formats I/MICROSOFT (*Microsoft*), Decision T 0424/03-3.5.01, 9-10 (Tech. Bd. App. Feb. 23, 2006), *available at* http://legal.european-patent-office.org/dg3/pdf/t030424eu1.pdf (stating that a computer-implemented method is distinct from a computer program and that a computer-implemented method is considered an invention under Article 52(1) of the EPC).

[12] *Auction Method*, *supra* note 4, at 580–81.

[13] *Id.* at 580–82, 585; *Duns Licensing*, *supra* note 4, at 18.

[14] *Duns Licensing*, *supra* note 4, at 18, 32; *Auction Method*, *supra* note 4, at 582–83 (citing General purpose management system/SOHEI, Decision T 0769/92-3.5.1, 8/1995 O.J. E.P.O. 525, headnote II (Tech. Bd. App. 1994), *available at* http://legal.european-patent-office.org/dg3/pdf/t920769ex1.pdf) ("Non-exclusion from patentability cannot be destroyed by an additional feature which as such would itself be excluded . . . .").

2. Board Decisions Addressing the Patentability of Software-Related Inventions.

a. The Auction Method *Case.* In the seminal case *Auction Method*, which has been cited in numerous subsequent cases, the Board considered whether an automated auction that was executable on a computer was patentable subject matter under Article 52.[15] The automated auction in *Auction Method* was claimed as an apparatus, method, and computer program.[16] Because the claimed apparatus and computer program carried out the steps in the method claim, the Board considered the method claim to be representative of the apparatus and computer program claims.[17]

The Board first addressed the patentability of the apparatus claim under Article 52. The apparatus claim claimed a "computerised auction apparatus for

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[15] *Auction Method*, *supra* note 4.

[16] *Id.* at 576–78.

[17] *See id.* at 576–77. The Board quoted the method claim of the main request as follows:

> 1. An automatic auction method executed in a server computer comprising the steps of:
>
> a) transmitting information on a product to be auctioned to a plurality of client computers via a network, each client computer belonging to a bidder;
>
> b) receiving a plurality of auction ordering information pieces, each including a desired price and a maximum price in competitive state, for purchase of said product, from the plurality of client computers via the network;
>
> c) storing the received auction ordering information pieces in the server computer for respective bidders;
>
> d) setting an auction price;
>
> e) determining whether there is any bidder who proposes a desired price equal to or higher than the auction price using the auction ordering information pieces stored in the server computer;
>
> f) if there is no bidder in the step e), lowering the auction price, and repeating the step e);
>
> g) if there is more than one bidder at step e), judging whether there is more than one bidder for whom the auction price is less than or equal to the desired price such that a competitive state occurs using the auction ordering information pieces stored in the server computer;
>
> h) if the competitive state occurs, increasing the auction price by a predetermined value;
>
> i) excluding the bidder who proposes acceptable a price lower than the increased auction price and specifying the other bidder or bidders using the auction ordering information;
>
> j) judging whether the competitive state occurs among the bidder or bidders specified in the step i);
>
> k) repeating the steps h), i) and j) and determining the remaining bidder as a successful bidder when there is no competitive state at step j; and
>
> l) if no competitive state occurs in the step g), determining the remaining bidder as a successful bidder.

Id.

performing an automatic auction via a network, among a plurality of bidders, the bidders using a corresponding plurality of client computers," with the apparatus comprising the means for performing the steps claimed in the method claim.[18] Citing *Controlling pension benefits system/PBS PARTNERSHIP*, the Board observed that "[a]n apparatus constituting a physical entity or concrete product, suitable for performing or supporting an economic activity is an invention within the meaning of Article 52(1) EPC."[19] In conformity with this observation, the Board ruled that the apparatus claim was "an invention within the meaning of Article 52(1) EPC since it comprises clearly technical features such as a 'server computer,' 'client computers,' and a 'network.' "[20] Hence, the Board identified physical devices having a technical nature to form a conclusion that the apparatus claim constituted patentable subject matter under Article 52.

The Board next addressed the patentability of the method claim, which claimed, "[a]n automatic auction method executed in a server computer."[21] The Board began by observing that the reasoning expounded for the apparatus claim also applied to the method claim even though a method is a different claim category.[22] The Board also found that the relevant inquiry in determining whether the method claim was an invention was "the presence of technical character which may be implied by the physical features of an entity or the nature of an activity, or may be conferred to a non-technical activity by the use of technical means."[23] Thus, activities or methods excluded from patentability as non-inventions, as such, "would typically represent purely abstract concepts devoid of any technical implications."[24] The Board held that the claimed method was an invention and therefore patentable subject matter under Article 52.[25]

The Board also rejected any approach to determining patentability that would conflate the patentability inquiry with an inventive step inquiry. To avoid such conflation, the Board concluded that "[t]he structure of the EPC therefore suggests that it should be possible to determine whether subject-matter is excluded under Article 52(2) EPC without any knowledge of the state of the art (including common general knowledge)."[26] Toward this end, the Board rejected

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[18] *Id.* at 577.

[19] *Id.* at 583 (citing Controlling pension benefits system/PBS PARTNERSHIP, Decision T 0931/95-3.5.1, 10/2001 O.J. E.P.O. 441, headnote III (Tech. Bd. App. 2000), *available at* http://www.european-patent-office.org/epo/pubs/oj001/10_01/10_4411.pdf).

[20] *Id.*

[21] *Id.* at 577.

[22] *Id.* at 584.

[23] *Id.* at 585.

[24] *Id.*

[25] *Id.*

[26] *Id.* at 580–81.

the "contribution approach" to determining the patentability of claimed subject matter.[27] The "contribution approach" is an approach that assesses the patentability of claimed subject matter based on the contribution that is made in a field not excluded from patentability.[28]

Significantly, the Board also recognized that "its comparatively broad interpretation of the term 'invention' in Article 52(1) EPC will include activities which are so familiar that their technical character tends to be overlooked, such as the act of writing using pen and paper."[29] This statement revealed the Board's intention that the "invention" threshold for claimed subject matter be a low threshold. Nonetheless, inventions under Article 52, the Board continued, must still "be new, represent a non-obvious technical solution to a technical problem, and be susceptible of industrial application" in order to be entitled to a patent.[30]

Finally, the Board addressed whether computer program claim 4 was patentable subject matter under Article 52.[31] Computer program claim 4 claimed a " 'computer program which, when run on a computer network comprising client computers and a server,' carries out the method of claim 1."[32] However, the Board declined to examine whether computer program claim 4 was an invention under Article 52 because of computer program claim 4's failure to involve an inventive step.[33] In conclusion, the Board in *Auction Method* set a low threshold for the patentability of software-related inventions and declined to consider any prior art in making a determination as to whether software-related claimed subject matter constituted an invention under Article 52.

b. The Duns Licensing *Case.* The Board's approach in *Auction Method* was affirmed in *Duns Licensing,* which involved a software-related invention used for business research purposes.[34] In particular, the Board addressed whether method claim 1 of the applicant's main request[35] and method claim 1 of the applicant's

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[27] *Id.* at 584.

[28] *Id.* at 581 (citing Text processing/IBM, Decision T 0038/86.3.5.1, headnote III (Tech. Bd. App. Feb. 14, 1989), *available at* http://legal.european-patent-office.org/dg3/biblio/t860038ep1.htm).

[29] *Id.* at 585.

[30] *Id.*

[31] *Id.* at 589.

[32] *Id.* at 577.

[33] *Id.* at 589.

[34] *See Duns Licensing, supra* note 4.

[35] Method claim 1 of the main request in *Duns Licensing* is as follows:

> 1. A method for estimating sales activity of a product at sales outlets (U1,U2) comprising:
>
> receiving sales data for said product from a plurality of first sales outlets (S1-S5);
>
> providing a database (205) of sales outlets, said database including geographic

first auxiliary request[36] constituted "inventions," and therefore patentable subject matter, under Article 52. The claims at issue in *Duns Licensing* provided a business method for estimating sales or product distribution at a non-reporting sales outlet based on sample sales data from reporting sales outlets.[37]

In making its decision, the Board confirmed the importance that an invention under Article 52 have a "technical character."[38] Because "[t]he enumeration of typical non-inventions in Article 52(2) EPC covers subjects whose common feature is a substantial lack of technical character," Article 52(2) may be used as guide for determining whether claimed subject matter has a "technical character."[39] The Board also cited, as a valid instrument for construing the EPC, the *Basic Proposal for the Revision of the European Patent Convention* (*Basic Proposal*),[40]

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data and characterizing data from said first sales outlets (S1-S5) and at least one other sales outlet (U1,U2);

determining the distance d_{su} between said other sales outlet (U1,U2) and each of a selected plurality of said first sales outlets (S1-S5) using said geographic data;

formulating a weighting factor for each of said selected plurality of said first sales outlets and said other sales outlet, said weighting factor being a function of said distance and said characterizing data; and

estimating the sales of said other sales outlet (U1,U2) using said sales data for said selected first sales outlets (S1-S5) and said weighting factors.

Id. at 1–2.

[36] Method claim 1 of the first auxiliary request is as follows:

1. A method for estimating sales activity of a product at sales outlets using a data processing system (U1,U2) comprising:

receiving sales data for said product from a plurality of first sales outlets (S1-S5);

providing a database (205) of sales outlets, said database including geographic data and characterizing data from said first sales outlets (S1-S5) and at least one other sales outlet (U1,U2);

operating a processor to determine the distance d_{su} between said other sales outlet (U1,U2) and each of a selected plurality of said first sales outlets (S1-S5) using said geographic data;

operating said processor to formulate a weighting factor for each of said selected plurality of said first sales outlets and said other sales outlet, said weighting factor being a function of said distance and said characterizing data; and

operating said processor to estimate the sales of said other sales outlet (U1,U2) using said sales data for said selected first sales outlets (S1-S5) and said weighting factors.

Id. at 2–3.

[37] *Id.* at 9–10.

[38] *Id.* at 21–25.

[39] *Id.* at 23.

[40] *Basic Proposal for the Revision of the European Patent Convention* (Oct. 13, 2000), *available at* http://documents.espo.org/projects/babylon/eponet.nsf/0/43F40380331CE97CC125727A0039243C/

which helps clarify the meaning of "technical character."[41] Specifically, the *Basic Proposal* states that "[i]n order to be patentable, the subject-matter claimed must therefore have a 'technical character' or to be more precise — involve a 'technical teaching,' ie [sic] an instruction addressed to a skilled person as to how to solve a particular technical problem using particular technical means."[42]

In addition, the Board took pains to stress the importance of separating the invention requirement on the one hand and the novelty and inventive step requirements on the other.[43] In fact, the Board dedicated eight pages of the decision to this topic.[44] In doing so, the Board also rejected considering prior art in making a determination as to whether claimed subject matter is an invention under Article 52.[45] For example, the Board stated that "[t]he presence of technical character is an invention (as well as for the industrial applicability) is an absolute requirement that does not imply any new contribution to the prior art."[46]

The Board concluded that method claim 1 of the main request was excluded from patentability under Article 52 because the claim was a method of business research analogous to schemes, rules, and methods of doing business.[47] Schemes, rules, and methods of doing business are explicitly excluded from patentability under Article 52(2)(c).[48] Specifically, the Board held that "[c]reating information about sales activities or other types of business data using mathematical and statistical methods to evaluate data gathered from the respective business environment is a business research activity, which like other research methods does not serve to solve a technical problem relevant to any technical field."[49] The Board continued:

> Interacting with and exploiting information about the physical word [sic] belongs to the very nature of any business-related activity. Accepting such features as sufficient for establishing patentability would render the exclusion of business methods under Article 52(2)(c) EPC meaningless. Therefore, the Board judges that gathering and evaluating data as part of a business research method, even if the data relates to physical parameters or geographic

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[41] *Id.* at 23–24.

[42] *Id.* at 24.

[43] *Id.* at 25–27.

[44] *Id.* at 25–32.

[45] *Id.*

[46] *Id.* at 25.

[47] *Id.* at 36–37.

[48] *See* EPC, *supra* note 4, at 271–72.

[49] *Duns Licensing, supra* note 4, at 36–37.

> information as in the present case, do not convey technical character to a business research method if such steps do not contribute to the technical solution of a technical problem.
>
> Determining sales data and geographical distances between outlets and using this data to estimate sales at specific outlets by means of the statistical method claimed and disclosed in the application do not solve any technical problem in a technical field. The definitions in claim 1 do not imply the use of any technical system or means. The term "database", in particular, may be construed to designate any collection of data so that claim 1 encompasses methods which may be performed without using any technical means at all.[50]

Thus, in addition to holding that method claim 1 of the main request was an excluded method of doing business, the Board also found that the claimed "database" did not lend any technical character to the method claim.[51] In particular, the Board construed "database" to include "any collection of data," and therefore not necessarily reliant upon technical means.[52]

In stark contrast, relying upon *Auction Method*, the Board held that method claim 1 of the first auxiliary request was an invention under Article 52.[53] Specifically, the Board held that "[a]uxiliary request 1 explicitly claims technical means (processor) to perform individual steps of the method. From the HITACHI decision T 258/03 (*supra*), Reasons Nos. 4.1 to 4.7, it follows that the claimed method is an invention in terms of Article 52(1) EPC."[54] The Board's reliance on the physical presence of the "processor" in method claim 1 of the first auxiliary request to reach the exact opposite conclusion than for method claim 1 of the main request indicates that the Board, in fact, tends to use a mere physicality requirement for determining whether claimed subject matter is an invention under Article 52.

c. The Microsoft *Case.* The Board's holding in *Microsoft* further strengthened the veiled physicality requirement in the Board's Article 52 jurisprudence.[55] In *Microsoft*, the Board addressed whether a method claim and a computer program claim for transferring data in a plurality of clipboard formats were inventions under Article 52.[56]

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[50] *Id.* at 37.
[51] *Id.*
[52] *Id.*
[53] *Id.* at 38.
[54] *Id.*
[55] *See Microsoft*, *supra* note 11.
[56] *Id.*

Regarding the computer-implemented method claim,[57] the Board concluded that the method claim was an invention under Article 52.[58] As in *Auction Method* and *Duns Licensing*, the Board in *Microsoft* identified a physical feature of the claim and used the physical feature to form a conclusion that the claim had technical character and was therefore an invention.[59] Specifically, the Board identified the clipboard feature of the claim, which the Board interpreted to be memory.[60] The Board, applying the rule in *Auction Method*, stated, "[a] computer system including a memory (clipboard) is a technical means, and consequently the claimed method has technical character in accordance with established case law."[61]

The Board also addressed the patentability of method claims that are implemented in a computer system, which the Board referred to as the computer-implemented method category of claims:

> Moreover, the Board would like to emphasise [sic] that a method implemented in a computer system represents a sequence of steps actually performed and achieving an effect, and not a sequence of computer-executable instructions (i.e. a computer program) which just have the potential of achieving such an effect when loaded into, and run on, a computer. Thus, the Board holds that the claim category of a computer-implemented method is distinguished from that of a computer program. Even though a method, in particular

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[57] Method claim 1 in *Microsoft* is as follows:

> 1. A method in a computer system (10) having a clipboard for performing data transfer of data in a clipboard format, said method comprising the steps of:
> providing several clipboard formats including a text clipboard format, a file contents clipboard format and a file group descriptor clipboard format,
> selecting data that is not a file for a data transfer operation,
> using the file contents clipboard format to hold said data by
> converting said selected data into converted data of said file contents clipboard format and storing the converted data as a data object,
> using the file group descriptor clipboard format to hold a file descriptor holding descriptive information about the data that is to be encapsulated into a file during the data transfer operation,
> completing the data transfer by providing a handle to said data object, using said handle to paste said data of said data object to a data sink,
> using said descriptive information to enable the computer system to create a file at the data sink and
> encapsulating the data object into said file.

Id. at 2.

[58] *Id.* at 9–11.

[59] *Id.* at 9–10.

[60] *Id.*

[61] *Id.* at 9.

> a method of operating a computer, may be put into practice with the help of a computer program, a claim relating to such a method does not claim a computer program in the category of a computer program. Hence, present claim 1 cannot relate to a computer program as such.[62]

Thus, the Board held that a computer-implemented method is distinguishable from a computer program product and therefore is not excluded by paragraph (2) of Article 52. Accordingly, the Board held that the method claim at issue in *Microsoft*, which was implemented in a computer system, was not a computer program as such and therefore was not excluded from being an invention under Article 52.[63]

Regarding the computer program claim in *Microsoft*, the Board concluded that it also constituted an invention under Article 52.[64] The computer program claim claimed "a computer-readable medium having computer-executable instructions adapted to cause the computer system to perform the method of" claim 1.[65] Once again, the Board reached the conclusion that the computer program was an invention by identifying a physical feature from the computer program claim and using the physical feature as evidence of a "technical character" of the claim.[66] The Board, citing *Auction Method*, specifically identified the "computer-readable medium" feature of the claim as evidencing a "technical character" of the claim. The Board explained as follows:

> Claim 5 is directed to a computer-readable medium having computer-executable instructions (i.e. a computer program) on it to cause the computer system to perform the claimed method. The subject-matter of claim 5 has technical character since it relates to a computer-readable medium, i.e. a technical product involving a carrier. Moreover, the computer-executable instructions have the potential of achieving the above-mentioned further technical effect of enhancing the internal operation of the computer, which goes beyond the elementary interaction of any hardware and software of data processing. The computer program recorded on the medium is therefore not considered to be a computer program as such, and

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[62] *Id.* at 10.
[63] *Id.*
[64] *Id.* at 10–11.
[65] *See id.* at 2.
[66] *Id.* at 11.

> thus also contributes to the technical character of the claimed subject-matter.[67]

In addition to identifying the physical feature of a computer-readable medium from the computer program claim to support a holding of patentability, the Board also noted that the computer-executable instructions "have the potential of achieving the above-mentioned further technical effect of enhancing the internal operation of the computer, which goes beyond the elementary interaction of any hardware and software of data processing."[68] Thus, the Board placed weight on the effect of the computer program on the internal operation of the computer. The Board, however, did not clarify the relative weight given to the presence of a physical feature on the one hand and the technical effect of the computer program claim on the other hand.

d. The Konami *Case.* In *Video game/Konami Co. (Konami)*, the Board again used the presence of a physical feature to determine patentability under Article 52.[69] Specifically, the Board in *Konami* considered whether a method claim[70] which made

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[67] *Id.* (citations omitted).

[68] *Id.*

[69] Decision T 0928/03-3.5.01 (Tech. Bd. App. June 2, 2006), *available at* http://legal.european-patent-office.org/dg3/pdf/t030928eu1.pdf.

[70] The method claim in *Konami* is as follows:

> 6. A guide displaying method for use in a video game system of the type in which a couple of teams, each having a plurality of player characters (P1, P2, P3) displayed on a monitor screen (13), compete with each other on a single game medium (B), at least one of said teams being under the control of a game player through a controller (8), said guide displaying method comprising:
>
> identifying the player character (P1), which keeps that game medium (B); and
>
> displaying a guide mark (G1, G2), which accompanies the identified player character (P1) and which indicates that said game medium (B) is kept by said identified player character,
>
> characterized in that
>
> [a] said guide mark (G1, G2) is ring-shaped and displayed on the image of the field plane (F) around the player character (P1, P2, P3) at a location near a [indefinite article reinserted by the Board] foot of said player character (P1, P2, P3),
>
> [b] wherein the displaying step further displays a pass guide mark (G3) accompanying another player character (P2), which belongs to the same team as said player character (P1) keeping said game medium (B) and to which said game medium (B) can most easily be passed from said player character (P1) keeping said game medium (B), and
>
> [c] wherein said guide displaying means displays said pass guide mark (G3) accompanying another player character (P2) such that [corrected from "said"] a portion of the pass guide mark (G3) is displayed on the end of the display area even when said another player character (P2) and said pass guide mark (G3)

a concealed indicator in a video game visible on a display screen was an invention under Article 52.[71] Specifically, the Board stated that:

> Eligibility for patent protection has not been called into question by the Examining Division. The guide display device according to claim 1 indeed represents a *physical entity* in particular comprising displaying means which have a technical character by their nature.
>
> The displaying steps of the independent method claim imply the use of displaying means which provides a technical character to the method.[72]

Thus, the Board used the physical feature of a "displaying means" in the method claim to form the conclusion that the method claim was an invention under Article 52.[73]

e. The Walker *Case.* In another example of the Board's use of physical features in an Article 52 analysis, the Board in *Text processor/Walker* (*Walker*) considered whether a method claim for enhancing text presentation on a display was an invention under Article 52.[74] The Board relied upon the claimed

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> come out of the display area of the monitor screen so as to properly indicate the direction in which the game medium (B) is to be passed by the player character (P1).

Id. at 3–4.

[71] *Id.* at 8–9.

[72] *Id.* (citation omitted) (emphasis added).

[73] *Id.*

[74] Decision T 0049/04-3.4.03, 2-3 (Tech. Bd. App. Oct. 18, 2005), *available at* http://legal.european-patent-office.org/dg3/pdf/t040049eu1.pdf. Method claim 1 of *Walker* is as follows:

> 1. A method for enhancing text presentation from a machine readable natural language text based on reader specific parameters including at least the viewing field dimensions comprising:
>
> (a) parsing said text into punctuation and parts of speech for extracting text specific attributes;
>
> (b) storing said text specific attributes in relation to the parts of speech to produce an enriched text;
>
> (c) applying primary folding rules followed by secondary folding rules to said enriched text, applied in order of a folding rule rank thereby dividing said text into text segments said folding rules having at least said punctuation attributes and parts of speech attributes as inputs and visual attributes as outputs;
>
> (d) applying secondary folding rules until a limit is reached, this limit preferably being the minimum line length; and
>
> (e) wherein the visual attributes include the displaying of the text segments in new lines;
>
> (f) applying text segment horizontal displacement rules to said text segments to determine a horizontal displacement for each text segment, said horizontal

invention's implementation in a "computer," as revealed by the following portion of *Walker*:

> It follows from the terms used in claim 1 ("machine readable natural language text", "parsing said text", "storing said text . . . to produce an enriched text", "displaying . . . across a display") that the method steps are to be implemented on a computer although this is not explicitly specified in the claim. Therefore the method of claim 1 meets the criteria set out in T 258/03 (Auction method/HITACHI OJ EPO 2004, 575) for being an invention within the meaning of Article 52(1) EPC. This applies *a fortiori* to the subject matter of independent device claim 12.[75]

The Board reasoned that because method claim 1 was implemented on a physical computer, method claim 1 recited patentable subject matter under Article 52.[76] The Board decided this even though method claim 1 did not explicitly recite a computer.[77] The Board's language may be interpreted to mean that a physical feature may be found in a claim either explicitly or implicitly by examining the claim language. The explicit or implicit physical feature may then be used as the basis for a patentability determination under Article 52.

f. The Man *Case.* In an opinion that both supported the notion that physical features, such as a computer, may be implied from the claim language and further strengthened the Board's line of cases basing "technical character" on the presence of physical features, the Board, in *Provision of product-specific data/MAN (Man)*, considered an apparatus claim and corresponding method claim that provided "product-specific data in a service station for recognition and editing of design and function states."[78] Specifically, the Board stated:

> displacement rules including parts of speech as inputs and visual attributes of horizontal displacement as outputs to produce an enhanced text; and
>
> (g) displaying said enhanced text by cascading the text segments in lines down and across a display.

Id.

[75] *Id.* at 6–7 (internal reference omitted).

[76] *Id.*

[77] *Id.* at 6.

[78] Decision T 1242/04-3.5.01, 07/2007 O.J. E.P.O. 421, 424 (Tech. App. Bd. 2007), *available at* http://www.european-patent-office.org/epo/pubs/oj007/07_07/07_4217.pdf. The apparatus claim in *Man* is as follows:

> 10. System for providing product specific data in a service station for recognition and editing of design and function states, characterised by
>
> a central database (1) for storing and providing equipment data for product components of all product types and the different variants, the equipment data

> Apart from the fact that, in keeping with T 931/95, even the apparatus category of claim 10 implies the presence of physical features and hence a technical character, both of the independent claims feature at least a central database for recording the required status and an archive store for recording the actual status which communicate with each other by computing means, which implies the use of a computer. Thus independent method claim 1 also uses technical means and in keeping with T 258/03 involves more than a purely abstract concept. Thus independent claims 1 and 10 both have a technical character and constitute inventions within the meaning of Article 52(1) EPC.[79]

In the cited portion of *Man*, the Board strongly equated the presence of a physical feature in the claim and the presence of technical character,[80] the latter being the key indicator of patentability under Article 52.[81] In particular, the Board stated that "the apparatus category of claim 10 implies the *presence of physical features and hence a technical character*."[82] In this case, the particular physical feature that was impliedly found in the claim was a "computer."[83]

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being updated by the manufacturer;

an archive store (3) in which is archived for each delivered product at least one dedicated data file (2) which can be retrieved via an identification code assigned thereto and which contains the individual equipment data of the particular delivered product (7), wherein

multiple user interfaces (5) are to be connected to the archive store (3) by telecommunication;

a computer-assisted program (4) which communicates with the central database (1) and the archive store (3) to generate new and/or updated data files and store them in the archive store (3);

multiple service stations with at least one user interface (5) via which a data file (2) allocated to the particular product (7) can be retrieved from the archive store (3) for editing of that product (7); and

equipment data for the product (7), comprising information on product components, hardware and software and on individual settings of product components, with changes to the individual product being stored in sequential data file versions (2) in the archive store (3); and

data file versions ($2_{(1-n)}$) stored in the archive store (3) reflecting the chronological sequence of changes to the particular product (7).

Id.

[79] *Id.* at 428.

[80] *Id.*

[81] *See supra* notes 6–7 and accompanying text.

[82] *Man*, *supra* note 78, at 428 (emphasis added).

[83] *Id.*

In summary, these cases adjudicated by the Board reveal that the Board has relied almost exclusively on the presence of a physical feature in a claimed invention to determine whether the claimed invention is an invention under Article 52. In those cases, the Board consistently identified one or more physical features from the claim at issue and held that the claim had a "technical character" on the basis of the identified physical features.[84] Also, in each decision, the physical features identified by the Board were hardware components of a computer. The following table shows the physical features identified by the Board to reach a conclusion that a claimed invention is patentable under Article 52:

CASE	"INVENTION" UNDER ARTICLE 52?	PHYSICAL FEATURE IDENTIFIED BY BOARD AS LENDING TECHNICAL CHARACTER
Auction Method	Yes	(1) Server computer, (2) client computers, and (3) network
Duns Licensing	Yes	Processor
Microsoft	Yes	(1) Clipboard, which Board interpreted as "memory" and (2) computer-readable medium
Konami	Yes	Displaying means
Walker	Yes	Computer (implied from language of the claim)
Man	Yes	Computer (implied from language of the claim)

Each of the features identified by the Board was either explicitly included in the claim or was implied from the language of the claim. In *Microsoft*, the Board also used another factor to determine whether a computer program claim was an invention under Article 52. Namely, the Board considered the effect of a

[84] *See, e.g., id.*

computer program claim on the internal operation of the computer.[85] Nonetheless, the Board also identified the physical feature of a computer-readable medium as lending technical character to the computer program claim.[86] In conclusion, recent cases adjudicated by the Board have relied heavily, if not exclusively, on the explicit or implicit presence of a physical feature relating to computers in the claimed invention to reach a determination of patentability under Article 52.

B. UNITED STATES LAW REGARDING PATENTABILITY OF SOFTWARE-RELATED INVENTIONS HAS GENERALLY EVOLVED TO INCLUDE A PHYSICALITY REQUIREMENT

1. Case Law from the U.S. Supreme Court and the U.S. Court of Appeals for the Federal Circuit Indicates a Gradual Evolution Toward a Physicality Requirement. In contrast to the relatively straightforward approach used by the Board, the U.S. Supreme Court and the U.S. Court of Appeals for the Federal Circuit (Federal Circuit) have used a more labyrinthian approach to determining patentability. Indeed, one may easily get the impression that the patentability of software-related inventions in the United States is not yet fully resolved. However, recent cases from the Federal Circuit have made a significant move away from these labyrinthian approaches in favor of an approach that provides a higher degree of certainty.[87] The conclusion may be drawn from these more recent cases that the United States has moved towards a physicality requirement that approximates that found in the European approach.

In U.S. law, the "first door which must be opened on the difficult path to patentability is [35 U.S.C.] § 101."[88] Indeed, "[o]nly if the requirements of § 101 are satisfied is the inventor 'allowed to pass through to' the other requirements for patentability, such as novelty under § 102 and, of pertinence to this case, non-obviousness under § 103."[89] Generally speaking, Congress intended statutory subject matter to "include anything under the sun that is made by man."[90] Nonetheless, 35 U.S.C. § 101 limits patentable subject matter as follows: "[w]hoever invents or discovers any new and useful process, machine,

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[85] *See Microsoft*, *supra* note 11, at 10–11.

[86] *Id.*

[87] *See, e.g.*, *In re* Comiskey, 499 F.3d 1365 (Fed. Cir. 2007); *In re* Nuijten, 500 F.3d 1346 (Fed. Cir. 2007).

[88] *Comiskey*, 499 F.3d at 1371 (citing State Street Bank & Trust v. Signature Fin. Group, 149 F.3d 1368, 1372 n.2 (Fed. Cir. 1998)).

[89] *Id.* at 1371 (citation omitted).

[90] Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) (citation omitted); S. REP. NO. 82-1979, at 2399 (1952).

manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."[91] The Federal Circuit has stated that "[t]he repetitive use of the expansive term 'any' in § 101 shows Congress's intent not to place any restrictions on the subject matter for which a patent may be obtained beyond those specifically recited in § 101."[92] Laws of nature, physical phenomena, and abstract ideas are excluded from patentability.[93] Also, certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application.[94]

The question of whether a claim encompasses statutory subject matter should focus on the essential characteristics of the subject matter, in particular, its practical utility.[95] Furthermore, insignificant post-solution activity will not transform an unpatentable principle into a patentable process.[96] A claim drawn to subject matter otherwise statutory does not become nonstatutory simply because the claim recites a mathematical formula, computer program, or digital computer.[97] Several important cases adjudicated by the Supreme Court and the Federal Circuit have shed light on these general rules of patentability under § 101.

a. Diehr. In *Diehr*, decided in 1981, the Supreme Court considered a claimed process for "molding raw, uncured synthetic rubber into cured precision products."[98]

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[91] 35 U.S.C. § 101 (2000).

[92] *State Street Bank*, 149 F.2d at 1373.

[93] *See, e.g.*, Diamond v. Diehr, 450 U.S. 175, 185 (1981); *State Street Bank*, 149 F.3d at 1373; *In re* Warmerdam, 33 F.3d 1354, 1358 (Fed. Cir. 1994); *In re* Alappat, 33 F.3d 1526, 1542 (Fed. Cir. 1994); Arrhythmia Research Tech., Inc. v. Corazonix Corp., 958 F.2d 1053, 1056 (Fed. Cir. 1992).

[94] *Alappat*, 33 F.3d at 1543.

[95] *State Street Bank*, 149 F.3d at 1375.

[96] *Diehr*, 450 U.S. at 183.

[97] *Id.* at 187; *Alappat*, 33 F.3d at 1544.

[98] *Diehr*, 450 U.S. at 177. Method claim 1, which is an example of the claimed invention, is 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),

The claimed process used a computer to calculate curing times based on an inputted temperature measurement.[99]

The Supreme Court observed that "[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."[100] The Court held that the claimed invention "involve[d] the transformation of an article, in this case raw uncured synthetic rubber, into a different state or thing."[101] Therefore, the claimed invention was patentable under § 101.[102]

The Supreme Court then considered the effects that computer-related aspects of the claimed invention had on the patentability of the claim. As an initial matter, the Court found that the claimed invention was directed toward a process of curing synthetic rubber and was not solely directed toward a mathematical formula.[103] Referring to the rule that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer," the Supreme Court found that the claimed invention's use of a computer did not preclude patentability.[104] Specifically, the Supreme Court stated, "one does not need a 'computer' to cure natural or synthetic rubber, but if the computer use incorporated in the process patent significantly lessens the possibility of 'overcuring' or 'undercuring,' the process as a whole does not thereby become unpatentable subject matter."[105] Referring to the claimed invention's use of the Arrhenius' equation, the Court stated that "Arrhenius' equation is not patentable in isolation, but when a process for curing rubber is devised which incorporates in it a more efficient solution of

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> repetitively calculating in the computer, at frequent intervals during each cure, [integrations to calculate from the series of temperature determinations] the Arrhenius equation for reaction time during the cure, which is
>
> $\ell n\, v = CZ + x$
>
> 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 equivanence.

Id. at 81 n.5.

[99] *Id.* at 178–79.

[100] *Id.* at 184 (quoting Gottschalk v. Benson, 409 U.S. 63, 70 (1972) (building on an earlier analysis of a process's eligibility for protection in *Cochran v. Deener*, 94 U.S. 780, 787–88 (1877))).

[101] *Diehr*, 450 U.S. at 184.

[102] *Id.*

[103] *Id.* at 187.

[104] *Id.*

[105] *Id.*

the equation, that process is at the very least not barred at the threshold by § 101."[106] Finally, foreshadowing a similar rule stated by the Boards of Appeal of the European Patent Office, the Court also determined that issues of novelty should not be considered when determining whether a claimed invention is patentable under § 101.[107]

b. Arrhythmia. In *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*,[108] the Federal Circuit considered whether method claims[109] and apparatus claims,[110] which were each directed to the analysis of electrocardiographic signals of the heart function, constituted statutory subject matter under § 101. The invention, as recited in the claims and described in the specification, required certain steps to be conducted with the aid of a computer.[111]

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[106] *Id.* at 188.

[107] *Id.*

[108] 958 F.2d 1053 (Fed. Cir. 1992).

[109] Method claim 1 in *Arrhythmia* is as follows:

> 1. 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:
>
> 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;
>
> applying a portion of said time segments in reverse time order to high pass filter means;
>
> determining an arithmetic value of the amplitude of the output of said filter; and
>
> comparing said value with said predetermined level.

Id. at 1055.

[110] Apparatus claim 7 in *Arrhythmia* is as follows:

> 1. Apparatus for analyzing electrocardiograph signals to determine the level of high frequency energy in the late QRS signal comprising:
>
> means for converting X, Y, and Z lead electrocardiographic input signals to digital valued time segments;
>
> means for examining said X, Y, and Z digital valued time segments and selecting therefrom the QRS waveform portions thereof;
>
> means for signal averaging a multiplicity of said selected QRS waveforms for each of said X, Y, and Z inputs and providing composite, digital X, Y, and Z QRS waveforms;
>
> high pass filter means;
>
> means for applying to said filter means, in reverse time order, the anterior portion of each said digital X, Y, and Z waveform; and
>
> means for comparing the output of said filter means with a predetermined level to obtain an indication of the presence of a high frequency, low level, energy component in the filter output of said anterior portions.

Id.

[111] *Id.*

The Federal Circuit, after citing *Diehr* with approval, set forth the two-part *Freeman-Walter-Abele* test for whether a computer-related claim is statutory subject matter under § 101.[112] The court also qualified the *Freeman-Walter-Abele* test by stating that it was not the only test for statutory subject matter and that the Federal Circuit had, on previous occasions, stated that failure to meet the test may not always defeat the claim.[113] Specifically, the court set forth the *Freeman-Walter-Abele* test as follows:

> It is first determined whether a mathematical algorithm is recited directly or indirectly in the claim. If so, it is next determined whether the claimed invention as a whole is no more than the algorithm itself; that is, whether the claim is directed to a mathematical algorithm that is not applied to or limited by physical elements or process steps. Such claims are nonstatutory. However, when the mathematical algorithm is applied in one or more steps of an otherwise statutory process claim, or one or more elements of an otherwise statutory apparatus claim, the requirements of section 101 are met.[114]

The Federal Court, in *Arrhythmia*, also quoted *In re Abele*, in which the Court of Customs and Patent Appeals explained:

> Patentable subject matter [is not limited] to claims in which structural relationships or process steps are defined, limited or refined by the application of the algorithm.
>
> Rather, *Walter* should be read as requiring no more than that the algorithm be "applied in any manner to physical elements or process steps," provided that its application is circumscribed by more than a field of use limitation or non-essential post-solution activity.[115]

The court further explained that "the emphasis is 'on *what* the claimed method steps do rather than *how* the steps are performed.' "[116] Thus, the Federal Circuit recognized the importance of physical elements or process steps in the patentability of process claims.

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[112] *Id.* at 1058–61.

[113] *Id.* at 1058.

[114] *Id.*

[115] *Id.* (citing *In re* Abele, 684 F.2d 902, 907 (C.C.P.A. 1982)).

[116] *Id.* at 1058 (quoting *Ex Parte* Logan, 20 U.S.P.Q.2d (BNA) 1465, 1468 (P.T.O. Bd. Pat. App. & Interf. 1991)).

Applying the first part of the *Freeman-Walter-Abele* test to the method claim, the Federal Circuit determined that a mathematical algorithm was included in the subject matter of the method claim.[117] Turning to the second part of the *Freeman-Walter-Abele* test, the court determined *what* the claimed process did. The court used the preamble of the method claim to determine that the claimed process was 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."[118] The court found that the claim included physical process steps that transform analog electrocardiograph signals into corresponding digital signals.[119] The court also found that the analog signals were not abstractions, but were related to a patient's heart function.[120] The court also observed that "[t]he resultant output is not an abstract number, but is a signal related to the patient's heart activity."[121] Using these aforementioned operations, the court concluded that the second part of the *Freeman-Walter-Abel* test was met because "the steps of Simson's claimed method comprise an otherwise statutory process whose mathematical procedures are applied to physical process steps."[122] In particular, the court concluded that the "claimed steps of 'converting', 'applying', 'determining', and 'comparing' are physical process steps that transform one physical, electrical signal into another," and that signals may be physical.[123]

Turning to the apparatus claims, the court first pointed out that the apparatus was claimed using "means plus function" clauses, thereby necessitating use of the specification to determine the nature of the apparatus.[124] The court identified physical features in the specification that were used to implement functions for the claimed apparatus, including an analog-to-digital converter, a minicomputer, electrical signals, disc memory unit, connecting leads, and a processing unit.[125] After stating these physical features, the court concluded that apparatus claims are statutory under § 101, as "[t]he computer-performed operations transform a particular input signal to a different output signal, in accordance with the internal structure of the computer as configured by electronic instructions."[126] Finally, in a nod to *Diehr*, the court observed that "[t]he use of mathematical formulae or relationships to describe the electronic structure and operation of an apparatus

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[117] *Id.* at 1059.
[118] *Id.*
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] *Id.*
[123] *Id.*
[124] *See id.* at 1060 (stating how the claim meets the format provided for in 35 U.S.C. § 112, ¶ 6).
[125] *Id.*
[126] *Id.*

does not make it nonstatutory."[127] Thus, the Federal Circuit, in analyzing both the method claims and the apparatus claims under the *Freeman-Walter-Abele* test, placed emphasis on the presence of physical features and transformation of physical features from one form to another.

c. Schrader. About two years after *Arrhythmia*, the Federal Circuit once again had occasion to apply the *Freeman-Walter-Abele* test in *In re Schrader*.[128] This time, the court considered a claimed invention that was directed to a method of competitively bidding on a plurality of related items.[129] The case is of particular interest because of the factual similarities with *Auction Method*, which was discussed in Part I.A.*1.a.*[130] However, unlike in *Auction Method*, the claimed invention in *Schrader* did not involve the use of a computer to implement the claimed steps.[131]

Regarding the first step of the *Freeman-Walter-Abele* test, the Federal Circuit observed that *Gottschalk* "defines a 'mathematical algorithm' for purpose of § 101 as a 'procedure for solving a given type of mathematical problem. . . .' "[132] Based on this observation, the court found that a mathematical algorithm was implicitly included in the method claim because the claim language "assembling a completion" was a procedure for solving the mathematical problem of determining the optimal combination of bids.[133] The court also noted that even simple algorithms, such as simple addition, might be considered to be mathematical algorithms.[134]

The court then turned to the second part of the *Freeman-Walter-Abele* test. The court confirmed that "a process claim [in] compliance with § 101 requires some

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[127] *Id.* (citing *In re* Iwahashi, 888 F.2d 1370, 1375 (Fed. Cir. 1989)).

[128] 22 F.3d 290 (Fed. Cir. 1994).

[129] *Id.* The method claim at issue in *Schrader* is as follows:

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

Id. at 292.

[130] *See supra* Part I.A.

[131] *See Schrader*, 22 F.3d at 292.

[132] *Id.* at 293 (citing Gottschalk v. Benson, 409 U.S. 63, 65 (1972)).

[133] *Id.* at 292.

[134] *Id.* at 293.

kind of transformation or reduction of subject matter . . . ."[135] The court emphasized that the claims in *Arrhythmia* "all involved the transformation or conversion of subject matter representative of or constituting *physical activity or objects*."[136] In particular, the physical activity in *Arrhythmia* was electrocardiograph signals representative of human cardiac activity.[137] In contrast, the court found that "Schrader's claims, except for incidental changes to a 'record,' do not reflect any transformation or conversion of subject matter representative of or constituting *physical activity or objects*."[138] Specifically, because "there is nothing physical about bids *per se*[,] . . . the grouping or regrouping of bids cannot constitute a physical change, effect, or result."[139]

The court also emphasized that "the recitation of insignificant post-solution activity in a claim involving the solving of a mathematical algorithm [cannot] impart patentability to [a] claim."[140] For *Schrader*'s method claims, the step of entering data into a 'record' was found to be implicit in any application of a mathematical algorithm, and was therefore too insignificant to impart patentability to the claim.[141]

In contrast to *Auction Method*, the Federal Circuit in *Schrader* found that the claimed auction method did constitute statutory subject matter.[142] However, one significant difference exists between the auction methods in each of these two cases. In *Auction Method*, the auction method claim was implemented by a computer and included physical computer features to implement the claim.[143] No such physical computer features were included in the auction method claim in *Schrader*. This difference is significant because in *Auction Method*, the Boards of Appeal of the European Patent Office actually relied on the presence of physical computer features, such as the server computer, client computers, and the network to find that the auction method was patentable. Because the court in *Schrader* relied heavily on the need for a physical transformation, and because the presence of a computer would not make "bids" physical objects, some doubt exists as to whether the Federal Circuit would have reached the same conclusion as the Board if the auction method in *Schrader* had been implemented by a computer.

d. Alappat. In the same year that *Schrader* was decided, the Federal Circuit, in *Alappat*, considered whether an apparatus claim was a mathematical algorithm

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[135] *Id.* at 295 (quoting Diamond v. Diehr, 450 U.S. 175, 192 (1981)).
[136] *Id.* at 294.
[137] *Id.*
[138] *Id.*
[139] *Id.* at 293–94.
[140] *Id.* at 294.
[141] *Id.*
[142] *Id.*
[143] *See supra* notes 18–24 and accompanying text.

and therefore excluded from patentability under § 101.[144] In particular, the apparatus claim in *Alappat* was directed to a rasterizer for converting vectors in a data list representing sample magnitudes of an input waveform into anti-aliased pixel illumination intensity data to be displayed on a display means.[145]

The court held that the claimed apparatus constituted a "machine" that produced a useful, concrete, and tangible result under § 101.[146] Specifically, the claimed apparatus "as a whole is directed to a combination of interrelated elements which combine to form a machine for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means."[147] Further, the inclusion of a mathematical algorithm in the apparatus claim did not preclude patentability, as the apparatus claim was "not 'so abstract and sweeping' that it would 'wholly pre-empt' the use of any apparatus employing the combination of mathematical calculations recited therein."[148]

Importantly, *Alappat* determined the patentability of an apparatus claim made up of "means-plus-function" clauses.[149] In one section of the opinion dedicated entirely to the interpretation of the means-plus-function clauses, the court imported several hardware features, such as logic circuits and read-only memory, into the apparatus claim.[150] Therefore, the court was mindful of, and possibly reliant upon, these physical features when deciding that the apparatus claim was a "machine"[151] under § 101.

The court also rejected the reasoning of the Board of Patent Appeals and Interferences that the apparatus claim was unpatentable merely because the claim reads on a general-purpose "digital computer 'means' to perform the various steps

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[144] *In re* Alappat, 33 F.3d 1526, 1538 (Fed. Cir. 1994). The apparatus claim in *Alappat* is as follows:

> 15. A rasterizer for converting vector list data representing sample magnitudes of an input waveform into anti-aliased pixel illumination intensity data to be displayed on a display means comprising:
>
> (a) means for determining a vertical distance between the endpoints of each of the vectors in the data list;
>
> (b) means for determining the elevation of a row of pixels that is spanned by the vector;
>
> (c) means for normalizing the vertical distance and elevation; and
>
> (d) means for outputting illumination intensity data as a predetermined function of the normalized vertical distance and elevation.

Id. at 1538–39.

[145] *Id.*

[146] *Id.* at 1541, 1544.

[147] *Id.* at 1544.

[148] *Id.* (citing Gottschalk v. Benson, 409 U.S. 63, 68–72 (1972)).

[149] *Id.* at 1540–42.

[150] *Id.* at 1541.

[151] *Id.* at 1541–42.

under program control."[152] In rejecting the view of the Board of Patent Appeals and Interferences, the court stated that "a computer operating pursuant to software *may* represent patentable subject matter, provided, of course, that the claimed subject matter meets all of the other requirements of Title 35."[153]

e. Warmerdam. In the same year that *Shrader* and *Alappat* were decided, the Federal Circuit also decided *In re Warmerdam*.[154] In *Warmerdam*, the court considered the patentability of method claims directed towards controlling "the motion of objects and machines, such as robotic machines, to avoid collision with other moving or fixed objects."[155] The court declined to follow the *Freeman-Walter-Abele* test or any approach that centered on whether the claim involved a mathematical algorithm. Specifically, the court provided the following critique of this line of cases:

> Within Supreme Court guidance, this court and its predecessor, as well as the Patent and Trademark Office (PTO), have sought to find more precise definitions for the things excluded, but without complete success. One notion that emerged and has been invoked in the computer related cases is that a patent cannot be obtained for a "mathematical algorithm." That rule is generally applied through a two-step protocol known as the *Freeman-Walter-Abele* test, developed by our predecessor court, the first step of which is to determine whether a mathematical algorithm is recited directly or indirectly in the claim, and the second step of which is to determine whether the claimed invention as a whole is no more than the algorithm itself.
>
> The difficulty is that there is no clear agreement as to what is a "mathematical algorithm", which makes rather dicey the determination of whether the claim as a whole is no more than that. An alternative to creating these arbitrary definitional terms which deviate from those used in the statute may lie simply in returning to the language of the statute and the Supreme Court's basic principles

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[152] *Id.* at 1545–46.

[153] *Id.*

[154] *In re* Warmerdam, 33 F.3d 1354 (Fed. Cir. 1994).

[155] *Id.* at 1355. Method claim 1 in *Warmerdam* is as follows:

> 1. A method for generating a data structure which represents the shape of [sic] physical object in a position and/or motion control machine as a hierarchy of bubbles, comprising the steps of:
>
> first locating the medial axis of the object and
>
> then creating a hierarchy of bubbles on the medial axis.

Id. at 1357.

> as enunciated in *Diehr*, and eschewing efforts to describe nonstatutory subject matter in other terms.[156]

The rule by which the court determined the patentability of the method claims in *Warmerdam* was formulated in accordance with these criticisms. Specifically, after dedicating several paragraphs to the issue of whether the method claims included mathematical subject matter, the court stated as follows:

> Compounding the difficulty of resolving the issue in "mathematical algorithm" terms is the lack of agreement, as previously noted, about the proper meaning of the label mathematical algorithm. We need not resolve the issue in these terms because we find that regardless whether the claim can be said to recite indirectly or directly a mathematical algorithm, the dispositive issue for assessing compliance with § 101 in this case is whether the claim is for a process that goes beyond simply manipulating "abstract ideas" or "natural phenomena."[157]

Using this approach, the court determined that the method claim in *Warmerdam* "involves no more than the manipulation of abstract ideas."[158] In particular, the court determined that the recited steps of "locating a medial axis" and "creating a bubble hierarchy" involved no more than the manipulation of abstract ideas.[159] The Federal Circuit's approach in *Warmerdam* represents a significant break from the previous jurisprudence that centered on the concept of a mathematical algorithm.

f. State Street Bank *and* Beauregard. In *State Street Bank & Trust Co. v. Signature Finance Group*, the Federal Circuit all but discarded the use of the *Freeman-Walter-Abele* test in determining patentability and instead placed focus on the practical utility of a claimed invention.[160] In that case, the court considered the patentability, under § 101, of a means-plus-function claim directed to "[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."[161] As

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[156] *Id.* at 1358–59 (citations omitted).

[157] *Id.* at 1360 (citation omitted).

[158] *Id.*

[159] *Id.*

[160] 149 F.3d 1368 (Fed. Cir. 1998).

[161] *Id.* The apparatus claim in *State Street Bank*, including in brackets the structural elements determined by the court to correspond to the means recited in the claim, is 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:

an initial matter, the court held that the claimed invention constituted a "machine" and therefore fell within a patentable subject matter category under § 101.[162]

The court proceeded to determine whether the claimed invention fell within a "mathematical algorithm" or "business method" exception to statutory subject matter. Regarding whether the claimed invention fell under the mathematical algorithm exception, the court revisited *Alappat* and *Arrhythmia* and categorized each as involving claimed inventions that corresponded to or produced a useful, concrete, and tangible result.[163] The court then stated that "the *Freeman-Walter-Abele* test has little, if any, applicability to determining the presence of statutory subject matter."[164] Setting forth what it believed to be the correct approach, 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—process, machine, manufacture, or composition of matter—but

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(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 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 and decreases based on 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 and decreases based on 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 specific files, 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.

Id. at 1371–72.

[162] *Id.*

[163] *Id.* at 1372–73.

[164] *Id.* at 1374.

rather on the essential characteristics of the subject matter, in particular, its practical utility."[165]

The court also placed great emphasis on whether the claimed invention produced a useful, concrete, and tangible result.[166] Using this approach, the court held as follows:

> Today, 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.[167]

The court also used its decision in *State Street Bank* as an opportunity to lay to rest the "ill-conceived" business method exception to patentable subject matter.[168] Thus, *State Street Bank* diminished the importance of the formulistic categorizations attributed to some claims, such as mathematical algorithm and business method, and instead focused on the practical utility of the claimed invention and whether the claimed invention had a useful, concrete, and tangible result.

In 1995, the Federal Circuit heard an appeal from Gary M. Beauregard in the case of *In re Beauregard*.[169] The controversy in that case originated when the Board of Patent Appeals and Interferences rejected Beauregard's computer program claims on the basis of the printed matter doctrine.[170] However, the Commissioner of Patent and Trademarks (Commissioner), in a significant concession, agreed with Beauregard's position on appeal that the printed matter doctrine was not applicable.[171] The Commissioner stated "that computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101 and must be examined under 35 U.S.C. §§ 102 and 103."[172] This case has been relied on to support the patentability of computer program product claims by embodying the computer program product in a tangible medium.

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[165] *Id.* at 1375.
[166] *Id.* at 1374–75.
[167] *Id.* at 1373.
[168] *Id.* at 1375.
[169] 53 F.3d 1583 (Fed. Cir. 1995).
[170] *Id.*
[171] *Id.* at 1584.
[172] *Id.* at 1583.

g. Recent Decisions Suggesting a Physicality Requirement. Most recently, on September 20, 2007, the Federal Circuit released two important opinions pertaining to the patentability of software-related inventions. The first case, *In re Comiskey*,[173] appears to take the determination of patentability under § 101 a step closer to the physicality approach seen in the cases by the Boards of Appeal of the European Patent Office and discussed in Part I.A above. In *Comiskey*, the court determined whether a method and system for mandatory arbitration involving legal documents, such as wills and contracts, were statutory subject matter under § 101.[174] The parties agreed that the independent claims did not require the use of a mechanical device, such as a computer.[175] However, some of the dependent claims did require such devices.[176]

The Federal Circuit clarified its holding in *State Street Bank* by upholding, in *Comiskey*, the lack of any bright line rule excluding business methods from patentability. Specifically, the court stated that "[a]lthough it has been suggested that *State Street Bank* supports the patentability of business methods generally,

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[173] 499 F.3d 1365 (Fed. Cir. 2007).

[174] *Id.* at 1369. The method claim in *Comiskey* is as follows:

> 1. A method for mandatory arbitration resolution regarding one or more unilateral documents comprising the steps of:
>
> enrolling a person and one or more unilateral documents associated with the person in a mandatory arbitration system at a time prior to or as of the time of creation of or execution of the one or more unilateral documents;
>
> incorporating arbitration language, that is specific to the enrolled person, in the previously enrolled unilateral document wherein the arbitration language provides that any contested issue related to the unilateral document must be presented to the mandatory arbitration system, in which the person and the one or more unilateral documents are enrolled, for binding arbitration wherein the contested issue comprises one or more of a challenge to the documents, interpretation of the documents, interpretation or application of terms of the documents and execution of the documents or terms of the documents;
>
> requiring a complainant to submit a request for arbitration resolution to the mandatory arbitration system wherein the request is directed to the contested issue related to the unilateral document containing the arbitration language;
>
> conducting arbitration resolution for the contested issue related to the unilateral document in response to the request for arbitration resolution;
>
> providing support to the arbitration; and
>
> determining an award or a decision for the contested issue related to the unilateral document in accordance with the incorporated arbitration language, wherein the award or the decision is final and binding with respect to the complainant.

Id. at 1369 n.1.

[175] *Comiskey*, 499 F.3d at 1369.

[176] *Id.*

State Street Bank explicitly held that business methods are 'subject to the same legal requirements for patentability as applied to any other process or method.' "[177]

The Federal Circuit then upheld the bedrock rule that abstract ideas, without more, may not be patented under § 101 and explained the reasoning behind that rule.[178] Specifically, the court stated that "[t]he prohibition against the patenting of abstract ideas has two distinct (though related) aspects. First, when an abstract concept has no claimed practical application, it is not patentable."[179] Second, even if the abstract concept may have a practical application,

> the Supreme Court has held that a claim reciting an algorithm or abstract idea can state statutory subject matter only if, as employed in the process, it is embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, i.e., a machine, manufacture, or composition of matter. As the PTO notes, "[t]he Supreme Court has recognized only two instances in which such a method may qualify as a section 101 process: when the process 'either [1] was tied to a particular apparatus' or [2] operated to change materials to a 'different state or thing.' " . . . Thus, a claim that involves both a mental process and one of the other categories of statutory subject matter (i.e., a machine, manufacture, or composition) may be patentable under § 101.[180]

These statements by the Federal Circuit approach the kind of physicality requirement seen in cases before the EPO because the court has stated that a mental process may be statutory as long as a machine, manufacture, or composition of matter is present in the claim. The court continued, "[f]or example, we have found processes involving mathematical algorithms used in computer technology patentable because they claimed practical application and were tied to specific machines."[181]

The court then turned to whether the claimed invention recited patentable subject matter. The appellant had conceded that the method claim, as well as claim 32, "do not require a machine, and these claims evidently do not describe a process of manufacture or a process for the alteration of a composition of matter."[182] The court determined that these claims did not recite statutory subject matter.

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[177] *Id.* at 1374 (footnote omitted) (quoting State Street Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368, 1375 (Fed. Cir. 1998)).

[178] *Id.* at 1376–77.

[179] *Id.*

[180] *Id.* (citations omitted).

[181] *Id.* at 1377.

[182] *Id.* at 1379.

On the other hand, claims 17 and 46 in *Comiskey* recited "the use of 'modules,' including 'a registration module for enrolling' a person, 'an arbitration module for incorporating arbitration language,' and 'an arbitration resolution module for requiring a complainant [or party] to submit a request for arbitration resolution to the mandatory arbitration system.' "[183] Claim 17 also recited "a means for selecting an arbitrator from an arbitrator database."[184] The court determined that "[t]hese claims, under the broadest reasonable interpretation, could require the use of a computer as part of Comiskey's arbitration system."[185]

The court also noted that claims 15, 30, 44, and 58 in *Comiskey* recited the following limitation: " 'wherein access to the mandatory arbitration is established through the Internet, intranet, World Wide Web, software application, telephone, television, cable, video [or radio], magnetic, electronic communications, or other communications means.' "[186] The court held that these claims claimed patentable subject matter. In providing rationale for this determination, the court stated that "[w]hile the mere use of the machine to collect data necessary for application of the mental process may not make the claim patentable subject matter, these claims in combining the use of machines with a mental process, claim patentable subject matter."[187] Although it contains a minor caveat, this latter statement, especially when considered along with the aforementioned statements of the Federal Circuit, appears to state the straightforward principle that a claimed invention that includes a mental process may be patented if a machine is included in the claims.

Because *Comiskey* was recently decided, one can only speculate how the case will be applied during patent prosecution and in other litigation. However, if *Comiskey* is construed as requiring only a physical feature in the claim, such as a computer or memory, such an interpretation may further strengthen the USPTO's current common practice of dropping § 101 rejections once a physical feature is included by amendment in the rejected claim. If *Comiskey* is interpreted in such a bright-line manner, the gap between the patentability requirements in the United States and in the EPO will have been bridged significantly, as both jurisdictions would lay significant weight on the involvement, or even mere presence, of a physical hardware feature in the claimed invention and base patentability on that physical feature.

On the same day that *Comiskey* was decided, the Federal Circuit also decided *In re Nuijten*.[188] In *Nuijten*, "[t]he issue before the court [was] whether or not a

[183] *Id.*
[184] *Id.*
[185] *Id.*
[186] *Id.* at 1379.
[187] *Id.* at 1380 (citations omitted).
[188] *In re* Nuijten, 500 F.3d 1346 (Fed. Cir. 2007).

signal is patentable subject matter."[189] Although the issue in *Nuijten* was relatively narrow, the case revealed the Federal Circuit's thought process when confronted with uncharted areas of subject matter. Also, the patentability of signals has become particularly important because software is now often deployed to computers over networks, resulting in less reliance on the physical delivery of software contained in physical media.[190] The claim at issue in *Nuijten* claimed a signal that used a technique for reducing distortion induced by the introduction of watermarks into signals.[191]

The Federal Circuit observed that "[t]he claims on appeal cover transitory electrical and electromagnetic signals propagating through some medium, such as wires, air, or a vacuum."[192] The court also made some observations about signals generally. Specifically, the court stated that "[a] 'signal' implies signaling—that is, the conveyance of information. To convey information to a recipient a physical carrier, such as an electromagnetic wave, is needed. Thus, in order to be a 'signal,' as required by the claim, some carrier upon which the information is embedded is required."[193] The court also noted that "Nuijten and the PTO agree that the claims include physical but transitory forms of signal transmission such as radio broadcasts, electrical signals through a wire, and light pulses through a fiber-optic cable, so long as those transmissions convey information encoded in the manner disclosed and claimed by Nuijten."[194]

To determine whether the claimed signal was statutory subject matter, the court "consider[ed] whether a transitory, propagating signal is within any of the four statutory categories: process, machine, manufacture, or composition of matter."[195] In particular, the court stated that "[i]f a claim covers material not found in any of the four statutory categories, that claim falls outside the plainly expressed scope of § 101 even if the subject matter is otherwise new and useful."[196] The court then proceeded to define each of the four categories of

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[189] *Id.* at 1348.

[190] *See* Jeffrey S. Draeger, *Are* Beauregard*'s Claims Really Valid*, 17 J. MARSHALL J. COMPUTER & INFO. L. 347, 373 & n.105 (1998) (noting that "Internet transmissions are becoming an increasingly important channel of software distribution").

[191] *Nuijten*, 500 F.3d at 1351. The signal claim in *Nuijten* is as follows:

> 14. A *signal* with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.

Id.

[192] *Id.* at 1352.

[193] *Id.* at 1353.

[194] *Id.*

[195] *Id.*

[196] *Id.* at 1354.

statutory subject matter and determine whether the claimed signal fell under any of the categories.[197]

The court first addressed whether the claimed signal was a "process."[198] The court stated that "[t]he Supreme Court and this court have consistently interpreted the statutory term 'process' to require action."[199] Based on this definition, the court concluded that "[s]ince a process claim must cover an act or series of acts and Nuijten's signal claims do not, the claims are not directed to a process."[200]

The court then cited the Supreme Court's definition of "machine" as " 'a concrete thing, consisting of parts, or of certain devices and combination of devices.' This 'includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result.' "[201] Based on this definition, the court found that "[a] transitory signal made of electrical or electromagnetic variances is not made of 'parts' or 'devices' in any mechanical sense."[202]

The court then cited the Supreme Court's definition of "manufacture" as " 'the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.' "[203] The court observed that "articles" are "tangible articles or commodities."[204] Based on these definitions, the Federal Circuit determined that "[a] transient electric or electromagnetic transmission does not fit within that definition."[205] Justifying this conclusion, the court stated:

> While such a transmission is man-made and physical—it exists in the real world and has tangible causes and effects—it is a change in electric potential that, to be perceived, must be measured at a certain point in space and time by equipment capable of detecting and interpreting the signal.[206]

Finally, the court cited the Supreme Court's definition of "composition of matter" as " 'all compositions of two or more substances and all composite articles, whether they be the results of chemical union, or of mechanical mixture,

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[197] *Id.* at 1354–58.
[198] *Id.* at 1354–55.
[199] *Id.* at 1354.
[200] *Id.* at 1355.
[201] *Id.*
[202] *Id.*
[203] *Id.* at 1356.
[204] *Id.*
[205] *Id.*
[206] *Id.*

or whether they be gases, fluids, powers or solids.' "[207] Based on this definition, the court found that the claimed signal was not a composition of matter.[208] Thus, signals, such as the one claimed in *Nuijten*, are not patentable subject matter because they do not fall into a § 101 category.[209] The impact of this decision on software-related inventions, especially those that are deployed over networks, remains to be seen.

2. The Examination Guidelines for Computer-Related Inventions. In 1996, the U.S. Patent and Trademark Office released the Examination Guidelines for Computer-Related Inventions (Guidelines) to assist U.S. Patent and Trademark Office personnel in the examination of patent applications.[210] The Guidelines greatly extrapolate the binding case law of the Supreme Court and Federal Circuit and are introduced with the following significant qualification:

> These Guidelines do not constitute substantive rulemaking and hence do not have the force and effect of law. These Guidelines have been designed to assist Office personnel in analyzing claimed subject matter for compliance with substantive law. Rejections will be based upon the substantive law and it is these rejections which are appealable. Consequently, any failure by Office personnel to follow the Guidelines is neither appealable nor petitionable.
>
> The Guidelines alter the procedures Office personnel will follow when examining applications drawn to computer-related inventions and are equally applicable to claimed inventions implemented in either hardware or software. The Guidelines also clarify the Office's position on certain patentability standards related to this field of technology. Office personnel are to rely on these Guidelines in the event of any inconsistent treatment of issues between these Guidelines and any earlier provided guidance from the Office.[211]

Hence, although the Guidelines may be helpful in understanding the processes of the USPTO, they should not be accorded too much weight. The jurisprudence of the Supreme Court and Federal Circuit, as seen in the cases discussed above, takes precedence over the Guidelines.[212]

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[207] *Id.* at 1357 (citing Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980)).
[208] *Id.*
[209] *Id.*
[210] Examination Guidelines for Computer-Related Inventions, 61 Fed. Reg. 7478 (Feb. 28, 1996).
[211] *Id.* at 7479.
[212] *See id.* (stating that the Guidelines do not have the effect of law).

The Guidelines, after giving a brief primer on case law regarding § 101, go on to identify categories of non-statutory subject matter. The first category described is "Functional Descriptive Material," or more specifically, " 'Data Structures' Representing Descriptive Material Per Se or Computer Programs Representing Computer Listings Per Se."[213] This category relates generally to data structures and computer programs that are not embodied on a computer-readable medium.[214] The second category is "Non-Functional Descriptive Material," "such as music, literature, art, photographs, and mere arrangements or compilations of facts or data."[215] The third category of nonstatutory subject matter is "Natural Phenomena Such as Electricity and Magnetism."[216]

The Guidelines then describe categories of statutory subject matter.[217] The Guidelines first list categories of statutory product claims.[218] The first category of statutory product claims consists of claims that encompass any machine or manufacture embodiment of a process.[219] Under this category, "[i]f a claim is found to encompass any and every product embodiment of the underlying process, and if the underlying process is statutory, the product claim should be classified as a statutory product."[220] The second category of statutory product claims consists of claims directed to specific machines and manufactures.[221] Under this category, "[a] claim limited to a specific machine or manufacture, which has a practical application in the technological arts, is statutory."[222] The Guidelines also add that "[i]n most cases, a claim to a specific machine or manufacture will have a practical application in the technological arts."[223]

The Guidelines then describe types of statutory process claims. This section begins with the following general guidance:

> A claim that requires one or more acts to be performed defines a process. However, not all processes are statutory under § 101. To be statutory, a claimed computer-related process must 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 . . .

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[213] *Id.* at 7481.
[214] *Id.*
[215] *Id.* at 7482.
[216] *Id.*
[217] *Id.*
[218] *Id.*
[219] *Id.*
[220] *Id.* at 7482–83.
[221] *Id.* at 7483.
[222] *Id.*
[223] *Id.*

> or (2) be limited by the language in the claim to a practical application within the technological arts .... The claimed practical application must be a further limitation upon the claimed subject matter if the process is confined to the internal operations of the computer. If a physical transformation occurs outside the computer, it is not necessary to claim the practical application. A disclosure that permits a skilled artisan to practice the claimed invention, i.e., to put it to a practical use, is sufficient. On the other hand, it is necessary to claim the practical application if there is no physical transformation or if the process merely manipulates concepts or converts one set of numbers into another.[224]

This section of the Guidelines then goes on to describe two types of "safe harbors" which ensure that a claimed process that results in a physical transformation outside the computer is statutory.[225] The first type of safe harbor requires the recitation of "physical acts to be performed outside the computer independent of and following the steps to be performed by a programmed computer, where those acts involve the manipulative of tangible physical objects and result in the object having a different physical attribute or structure."[226] The second type of safe harbor

> 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.[227]

In addition to these safe harbors, computer-related processes that are limited to a practical application in the technological arts are statutory.[228] One example provided by the Guidelines of this type of claim is "a computerized method of optimally controlling transfer, storage and retrieval of data between cache and hard disk storage devices such that the most frequently used data is readily available."[229]

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[224] *Id.*
[225] *Id.* at 7483–84.
[226] *Id.* at 7483.
[227] *Id.* at 7484 (footnotes omitted).
[228] *Id.*
[229] *Id.*

The Guidelines also state that "if the 'acts' of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter."[230] For example, "claims define a non-statutory process if they: [1] consist solely of mathematical operations without some claimed practical application (i.e., executing a 'mathematical algorithm'), or [2] simply manipulate abstract ideas, e.g., a bid or a bubble hierarchy, without some claimed practical application."[231] The Guidelines also provide guidance as to when claim language related to mathematical operation steps of a process may properly limit a claim.[232] Finally, the Guidelines state that "a process that consists solely of the manipulation of an abstract idea without any limitation to a practical application is non-statutory."[233]

Although somewhat convoluted and arguably out-of-touch with U.S. case law, the Guidelines, in practice, do not rule out a physical requirement for software-related inventions. In fact, the Guidelines' emphasis on practical applications, tangible physical objects, and physical transformations may be viewed as buttressing a physicality requirement. However, one should also recognize that the Guidelines do not embrace such a physicality requirement explicitly, and even give some indication that other factors will be considered.[234] For example, the Guidelines state that "[a] claimed process that consists solely of mathematical operations is non-statutory whether or not it is performed on a computer."[235] This statement seems to contravene *Comiskey*'s rule that an algorithm may be statutory subject matter if the algorithm somehow involves another class of statutory subject matter (i.e., a machine, manufacture, or composition).

However, one runs the risk of losing sight of the forest for the trees by analyzing the Guidelines too extensively. The Guidelines, as discussed above, are not binding law, and have not been amended since the publication of *Comiskey* and *Nuijten*. Furthermore, as many a patent practitioner has observed, the USPTO is often satisfied with respect to the patentability of a computer program product if the claimed computer program product recites a tangible medium, such as a recordable-type medium. The effect of *Comiskey* and *Nuijten* on actual practice before the USPTO remains to be seen.

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[230] *Id.*

[231] *Id.*

[232] *See id.* at 7486 (stating that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of the claim).

[233] *Id.*

[234] *Id.*

[235] *Id.* at 7484.

C. CONCLUSIONS REGARDING PATENTABILITY UNDER THE EUROPEAN PATENT CONVENTION AND UNITED STATES LAW

Recent cases adjudicated by the Boards of Appeal of the European Patent Office rely heavily, if not exclusively, on the explicit or implicit presence of a physical feature relating to computers in the claimed invention to reach a determination of patentability under Article 52.[236] On the other side of the Atlantic Ocean, U.S. courts have struggled for years to come up with a solution for how to treat software-related inventions. Early on, U.S. courts focused on the presence of a "mathematical algorithm," but this approach became generally disfavored over time. Interestingly, recent case law from U.S. courts has gradually moved toward a physicality requirement that focuses on the presence of a machine, manufacture, or composition in the claimed invention.[237] This conclusion is consummated in *Comiskey*, in which the Federal Circuit stated that

> "[t]he Supreme Court has recognized only two instances in which such a method may qualify as a section 101 process: when the process 'either [1] was tied to a particular apparatus' or [2] operated to change materials to a 'different state or thing.' " . . . Thus, a claim that involves both a mental process and one of the other categories of statutory subject matter (i.e., a machine, manufacture, or composition) may be patentable under § 101.[238]

Regarding claims other than methods, the Federal Circuit in *Nuijten* defined the categories of machine, article of manufacture, and composition of matter as requiring physical, and not merely transitory, features.[239] Thus, although *Nuijten* did express disfavor toward transient physical features, *Nuijten* further supports the general move toward requiring a physical feature similar to that required by the EPO, especially since the EPO, in all of the cases discussed in this Article, identified physical hardware features that were not transient. Thus, in light of recent case law, one may observe a general convergence on a physicality requirement on both sides of the Atlantic Ocean.

Despite this simple point of convergence, one should nonetheless be aware of differences that continue to exist between the two jurisdictions' approaches. For example, the Board will imply physical hardware features from the surrounding text in the claimed invention. No corresponding trend may be gleaned in the United States. Also, the strong emphasis on the "involvement" of

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[236] *See supra* Part I.A.

[237] *See supra* Part I.B.*1*.

[238] *In re* Comiskey, 499 F.3d 1365, 1376–77 (Fed. Cir. 2007).

[239] *In re* Nuijten, 500 F.3d 1346 (Fed. Cir. 2007).

physical features, as consummated in *Comiskey*, is by no means settled in the United States. Caution towards a wholehearted adoption of a physicality requirement is exemplified by the statement in *Comiskey* that "the mere use of the machine to collect data necessary for application of the mental process may not make the claim patentable subject matter."[240] This statement opens to the door to a possible examination of *how* the physical feature is claimed, which is more involved than simply requiring a mere presence or involvement. *Nuijten*'s disfavor of "transient" physical features also gives us reason to be cautious in concluding the existence of a physicality requirement in U.S. law.

Another lesson that may be gleaned from the evolution of U.S. case law is the general undesirability of convoluted approaches to determining patentability. The Federal Circuit's frustration with these convoluted approaches, such as the approach centering on the "mathematical algorithm," is evident in the discussion above.[241] Such approaches involve esoteric discourse on metaphysical ideas that border on the philosophical and are adverse to providing certainty to practitioners who increasingly deal with software-related inventions. A physicality requirement, however, which focuses on the presence of a physical hardware feature, is an easy-to-understand rule that gives practitioners a high degree of certainty. Case law in Europe and the United States will continue to evolve, and new innovations may make such a physicality requirement obsolete. However, courts on each continent should be cognizant of the importance of certainty and avoid the web-like approaches that plagued early U.S. case law on the patentability of software-related inventions.

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[240] *Comiskey*, 499 F.3d at 1380.

[241] *See supra* Part I.B.*1*.