OVERCOMING 35 U.S.C. § 101 REJECTIONS OF ELECTRONIC AND COMPUTER INVENTIONS*

Authors: Robert Greene Sterne, Edward J. Kessler, Robert E. Sokohl, Michael Q. Lee, Robert R. Axenfeld

STERNE, KESSLER, GOLDSTEIN & FOX
WASHINGTON, D.C. 20005

Software permeates all electronic and computer systems today. The decision to implement functionality in either software or hardware is often a design choice. Historically, the presence of software in an invention raised the red flag of non-statutory subject matter under 35 U.S.C. § 101 at the United States Patent and Trademark Office (USPTO). In the last several years, the percentage of electronic and computer applications receiving statutory subject matter rejections has increased significantly. Such rejections are being received on all types of electronic and computer inventions, including ones that are entirely implemented in hardware.

This article gives practical advice on how to overcome a statutory subject matter rejection of any type of electronic or computer invention. It is based on the authors' experience in overcoming such rejections in many recent patent applications.

1. Introduction

The USPTO has developed an official policy of asserting non-statutory subject matter rejections under 35 U.S.C. § 101 where inventions are expressed in terms of computer-implemented mathematical algorithms or implemented in computer software. This is a problem in that: (1) most electronic and computer inventions can be expressed in terms of "mathematical algorithms" and/or many are implemented in "software" and, consequently, there is practically no limit where such rejections can be applied; and (2) these inventions recite subject matter which otherwise would and should qualify as viable inventions (subject matter) under § 101 if the Constitutional patent mandate is to promote the progress of useful arts by granting a limited

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* The views expressed are for purposes of education only and do not necessarily reflect those of the authors, their firm or their clients.

2. Identifying Whether the Rejection is a Form or Customized Rejection

The first step in our suggested methodology for overcoming § 101 rejections is to identify whether the rejection is a form or customized rejection. A form rejection typically includes broad generalized statements regarding § 101 and the surrounding case law. It does not apply the law to the individual claims. Rather, it makes bald assertions that the claims in general are directed towards non-statutory subject matter. In most instances, the Examiner uses a form rejection when he wants to reject the claims under § 101 because they are allegedly directed to a computer program or "software" intended to run on a computer.

A customized rejection contains more specific recitations of the case law as they apply to § 101 and the claims at issue. These rejections typically reject each claim individually for a specific reason. Mathematical algorithms rejections are typically customized rejections. The Examiner cites the two part Freeman-Walter-Abele[4] test and applies it to the claims. If necessary, the Examiner will cite cases to support the propositions that field of use limitations and data gathering are insufficient to change a non-statutory claim into a statutory one.

3. Responding To § 101 Rejections

The next step in our suggested methodology for overcoming § 101 rejections is to prepare a response to the rejection. The strategy for preparing the response depends on whether the rejection is directed to a mathematical algorithm-related invention or a computer software-related invention. Accordingly, these two bases of rejection are considered separately in the following sections.

3.1. Responding To § 101 (Mathematical Algorithm) Rejections

As discussed above, most mathematical algorithm rejections are tailored to the individual claims. Nevertheless, the format of the rejection is usually a standard generic form.

The typical (mathematical algorithm) rejection goes something like this:

> The basis of this rejection is set forth in the two-step test given by *In re Freeman*, 197 USPQ 464 (CCPA 1978), as modified by *In re Walter*, 205 USPQ 397 (CCPA 1980), and *In re Abele*, 214 USPQ 682 (CCPA 1982). The first part of the *Freeman-Walter-Abele* test is to determine whether an algorithm is either directly or indirectly claimed. Once the first part of the *Freeman-Walter-Abele*

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[4] *In re Freeman*, 197 USPQ 464 (CCPA 1978); *In re Walter*, 205 USPQ 397 (CCPA 1980); and *In re Abele*, 214 USPQ 682 (CCPA 1982).

> test is met, the claims, taken as a whole, must be analyzed to determine whether or not the claims preempt a mathematical algorithm. Under the second test, as modified by *Abele*, the claims are considered without the algorithm to determine whether the remainder is "otherwise statutory."

If necessary, the rejection also states:

> "Field of use" or "end use" limitations have been held to be insufficient to constitute a statutory method or process. The courts have also held that the steps for providing data necessary for the proper operation of the algorithm cannot make a claim statutory. Further, without the incorporation of significant post-solution activity, claims cannot pass muster under 35 U.S.C. § 101.

Overcoming these rejections can sometimes be tricky. The length of this paper does not allow us to discuss a complete methodology for responding to this type of § 101 rejection.[5]

The single most important question to ask is "What did the applicant invent?" *In re Grams*, 12 USPQ2d 1824 (Fed. Cir. 1989). If the Examiner cannot answer this question after reviewing the claims, and the claims include a direct or indirect recitation of a mathematical algorithm, one can expect to receive a statutory subject matter rejection. As such, the patent attorney must draft the preamble and the body of the claims with this question in mind.

We recommend citing liberally from *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 22 USPQ2d 1033 (Fed. Cir. 1992).[6] The *Arrhythmia* Court did not ignore the preamble of the claims at issue, and neither should the drafting attorney.[7] The preamble is the perfect place to emphasize "what the claimed method steps do rather than *how* the steps are performed."

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[5] *See, e.g.,* Stuart P. Meyer, "Obtaining and Enforcing Patents for Software-Related Inventions: Avoiding the Pitfalls", 14th Annual Computer law Institute, PLI, Vol.2, 1992, which provides a detailed analysis.

[6] Currently, the USPTO is deliberately ignoring *Arrhythmia*. *See, e.g., Ex parte Alappat*, 23 USPQ2d 1340 (Bd. Pat. App. & Int. 1992)("*Arrhythmia* was an appeal from an infringement action involving a patent, and the rules of claim construction of patent claims are different than rules for claim interpretation during *ex parte* prosection.)

[7] The court stated that the preamble is a claim limitation and should "not [be] ignored in determining whether the subject matter as a whole is statutory, for all of the claim steps are an implementation of this method." *Arrhythmia*, 22 USPQ2d at 1038.

Ex Parte Logan, 20 USPQ2d 1465, 1468 (PTO Bd. App. and Interf. 1991)(emphasis in original).

The *Arrhythmia* court also stated that "the view that there is nothing necessarily physical about 'signals' is incorrect." *Arrhythmia*, 22 USPQ2d at 1038. Many, if not all, computer-program related inventions can be claimed in terms of "signals." Computers operate according to signals. By converting numerical inputs and outputs that appear in the claims into signals, the mathematical algorithm rejection can oftentimes be overcome.[8] In fact, anything that is being manipulated or transformed can typically be drafted in terms of "signals."

If the purpose of the computer-program related invention is to transform or reduce an article to a different state or thing, the claim must be drafted accordingly.[9] Inventions that perform physical steps on physical elements cannot preempt the mathematical algorithm and, as such, pass muster under § 101. The *Arrhythmia* court (citing *Walter*) stated that no more is required "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." Significant (or essential) post-solution activity will render statutory a claim reciting a mathematical algorithm, either directly or indirectly. Exactly what is *significant* can be debated,[10] but arguing that a certain activity is significant can oftentimes aid the patent attorney in overcoming mathematical algorithm rejections.

Claims drawn to computer-program related inventions should include the term "computer-based" or "computer-implemented" in the preamble before the terms method and system. This

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[8] Although it can usually be argued that signals are inherent to all electronic and computer systems, the patent application should initially be drafted with the term "signal" used throughout in any case that potentially involves mathematical algorithms.

[9] "When a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), the claim satisfies the requirements of § 101." *Diamond v. Diehr*, 450 U.S. 175 (1981).

[10] *See, e.g., Diamond v. Diehr*, 450 U.S. 175 (1981)(holding that the opening of a mold was significant post-solution activity); *Ex part Akamatsu*, 22 USPQ2d 1915 (Bd. of Pat. App. and Interf. 1992)(holding that the displaying of a graphic point on a display device was not significant).

addition to the preamble can be an effective easy way to overcome mathematical algorithm rejection (or to avoid receiving the rejection in the first place).[11]

3.2. Responding To § 101 (Computer Software) Rejections

In responding to a § 101 (computer software) rejection, it is first necessary to identify the Examiner's rationale for issuing the rejection. Then, a response to the rejection is prepared in accordance with such identification (i.e, the response is tailored to the particular rationale used by the Examiner). These steps for responding to § 101 (computer software) rejections are discussed in the following two sections.

3.2.1. Identifying the Rationale Underlying the § 101 (Computer Software) Rejection

The USPTO employs a number of rationales to reject computer software claims under § 101. The rationale used most frequently by the USPTO is that computer software is non-statutory since it does not fall within any of the statutory classes of § 101 (i.e., process, machine, manufacture, or composition of matter). The USPTO routinely issues this rejection even when the claim preamble explicitly directs the claim to one of the statutory classes (i.e., "A process of * * *" or "A machine for * * *"). The reason given by the USPTO usually goes something like this:

> Applicant has attempted to categorize the invention in the preamble as an apparatus [or system, method, etc.]. However, it is clear that the body of the claim is directed to computer "code" since no computer is claimed. Non-statutory subject matter cannot be automatically converted into statutory subject matter by broadly labeling the claim as an "apparatus", since this form of draftsmanship would amount to elevating form over substance.

Another common rationale used by the USPTO is that computer software is non-statutory since it merely constitutes printed matter. "Printed matter" according to a line of older CCPA decisions is not statutory. In the context of this rationale, it appears that the USPTO is equating a "print-out" of a computer program with the computer program itself. This rejection is typically issued against method claims, rather than apparatus claims, and is usually phrased as follows:

> Computer code or software, like printed matter, has no distinct structure itself but is only representative of a type of information; by analogy to printed matter, such

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[11] The Examiner will often suggest that the method cannot operate without a computer, and that the claim must be amended accordingly. Amending the claims with "computer-based" can oftentimes be a viable solution to overcoming the mathematical algorithm rejection.

> abstractions from physical method steps or apparatus are not deemed to be patentable subject matter.

A rationale which the USPTO is using more frequently is that computer software is non-statutory since it merely constitutes mental steps (a method which can be substantially practiced using only a human mind is not statutory -- such a method is said to constitute "mental steps"). The language of this rejection usually takes the following form:

> The claims recite various steps or actions all of which are believed to be capable of being performed in a human brain, thus falling under the 'mental steps' exception of 35 U.S.C. § 101.

The USPTO is also couching software non-statutory subject matter rejections in terms of 35 U.S.C. §§ 103 and 112, first paragraph (enablement). Section 103 rejections are being issued against "computer program product" claims, which claim software stored on a floppy disk (or other computer readable medium).[12] In these § 103 rejections, the USPTO typically contends that the claims are unpatentable over the well-known data processing technique of storing software on storage media. Usually, the rejection does not address any of the novel or unobvious features of the claimed software.

Section 112, first paragraph, rejections are often issued against computer-related apparatus claims which are written in means plus function language, and which do not positively recite a computer. In these rejections, the Examiner essentially interprets the means plus function elements as only reading on a computer program. The Examiner then objects to the specification under 35 U.S.C. § 112, first paragraph, as not being enabling since the specification does not disclose "how a mere program, without more, can carry out the functions recited in the means plus function language". Then, the Examiner rejects the claims under 35 U.S.C. § 112, first paragraph, for the same reasons set forth in the objection.

Usually, the USPTO relies upon more than one of the above bases to reject software-related claims on non-statutory subject matter grounds. One should not be surprised to see *all* of the above bases in any particular Office Action. Of course, this rejection(s) is in addition to any prior art rejections issued by the Patent Examiner.

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[12] While it is beyond the scope of this paper, many experts believe that this claim format results in direct infringement by a party who makes software alone that is not bundled with hardware - a very common scenario. The USPTO issued several celebrated patents with this claim format before stopping this practice due to perceived political pressure from some parts of the industry.

3.2.2. Tailoring the Response to the Rationale Used by the Examiner

In responding to § 101 (non-statutory subject matter) rejections of computer software claims, the threshold question is once again whether to traverse or accommodate the rejection.

In answering this question, we recommend that the patent attorney look to whether the rejection is a form rejection or a customized rejection (see Section 2, above). We recommend taking a firm stance when responding to form rejections. The patent attorney should explain to the Examiner that his/her broad brush rejection must discuss the claims individually and with particularity. Where a major technical rejection is given by the Examiner (e.g., non-statutory subject matter), such rejection should be stated with full development of the reasons rather than by a mere conclusion coupled with some stereotyped expression.[13] Each claim should be considered separately, and a clear reason for rejecting each claim should be given. The rejections are rarely based on established law, but rather based on conjecture on the part of the USPTO.

Customized rejections require more care and consideration by the Examiner than a form rejection. Nevertheless, they can also be overcome, as outlined below. We first consider traversing § 101 rejections.

In traversing a rejection of computer software claims, we recommend attacking the USPTO's underlying premise of the rejection: computer software is *per se* non-statutory. In point of fact, there has been no decision of the Supreme Court, CCPA, Federal Circuit, or the BPAI (including its predecessor) which has specifically held that computer software constitutes non-statutory subject matter *per se*. The USPTO's position that computer software is per se non-statutory is simply *one* interpretation of existing case law.[14]

We recommend traversing § 101 rejections of computer software claims by simply asserting that no court has clearly held that computer software is per se non-statutory. This assertion should be accompanied by a thorough and well-reasoned discussion of the law. This discussion should advocate the position that computer software is *per se* statutory subject matter. Considering the holdings in such cases as *Arrhythmia,* such an interpretation is *at least* as reasonable as the USPTO's contrary interpretation. Then, we recommend requesting that the Examiner withdraw the rejection, or identify any cases *explicitly and unambiguously* holding that computer software is per se non-statutory.

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[13] See M.P.E.P. § 706.03.

[14] Many experts argue that the USPTO's position is an *unreasonable* interpretation of case law.

The suggestions in the prior two paragraphs address traversing those § 101 rejections which allege that the claims do not recite subject matter which fall within one of the statutory classes. Recall that the USPTO also uses two other rationales under § 101 -- printed matter and mental steps. Traversing rejections which employ these two rationales are discussed below.

The printed matter rejection is premised on the allegation that "computer software, like printed matter, has no distinct structure itself but is only representative of a type of information". While printed matter is not statutory, it is well settled that the processes, machines, compositions of matter, etc., described by the printed matter are eligible for patent protection. Similarly, a print-out of a computer program may not constitute statutory subject matter under the printed matter rejection. However, the processes and functions which comprise the computer program should constitute statutory subject matter. Accordingly, the USPTO's contention that computer software-related processes and functions do not have "distinct structure", but are "only representative of a type of information," if correctly understood, appears flawed. The processes and functions which comprise computer software have as much structure as other non-computer program related processes, such processes being statutory as explicitly codified in 35 U.S.C. § 101. We recommend traversing printed matter rejections in accordance with the above statements.

The mental steps rejection is based on the allegation that "the claims recite various steps or actions all of which are believed to be capable of being performed in a human brain". Often, computers and the programs which control the computers find value in relieving humans of repetitive tasks. When the tasks are simple, the mental steps rejection may be a fair one. When the tasks are complex or involve interaction with devices which do not have a "human friendly" interface (for example, direct electrical interaction with an electrical diagnostic device). The mental step rejections may not, and probably is not, a fair one. The mental steps rejection is one which must be considered on a per claim basis. When the rejection is not fair, then it can be traversed in the conventional manner by discussing the ways in which the claimed subject matter cannot be performed in a human brain.

The traversal strategies presented above have been successful in a number of cases. Often, the strategy is most effective if first presented to the Examiner in an in-person interview. However, given the current posture of the USPTO, it is prudent not to rely on any one strategy. Accordingly, we recommend adding claims or amending at least some of the pending claims to accommodate the rejection, even if you intend to traverse the rejection. Filing continuation applications works well in these instances (it passes to issue the accommodated claims and provides an independent basis for traversal). Accommodating § 101 rejections of computer software claims is discussed below.

Often, § 101 rejections of computer software claims can be easily accommodated without unduly limiting the scope of the claims. Frequently, the rejection will even suggest the type of claim amendment which would be sufficient to overcome the rejection.

For example, § 101 rejections of method claims (alleging that the claims do not recite subject matter falling within one of the statutory classes) often include the following statement: "The claims are not directed to a computer implemented process, i.e., to a series of steps performed by a computer, which processes were held by the CCPA to constitute statutory subject matter unless within a judicially determined exception to 101". As suggested by the language of the rejections themselves, such § 101 rejections can often be successfully accommodated by amending the claim to explicitly recite a *computer implemented* method comprising steps which are *executed in a data processing apparatus*. This type of amendment is also frequently successful in overcoming § 101 printed matter rejections, since it makes clear that the claimed subject matter is not "only representative of a type of information". Similarly, this type of amendment is also frequently successful in overcoming § 101 mental steps rejections, since it makes clear that the claimed subject matter is not directed to steps which are performed in a human brain.

The following statement is often used by the USPTO to justify § 101 rejections of apparatus claims: "It is clear that the body of the claim is directed to computer code since no computer is claimed". As suggested by the language of the rejections themselves, such § 101 rejections can often be successfully accommodated by amending the claim to positively recite a data processing apparatus or, simply, a computer (and to amend the claim elements to "operate in said computer"). While certainly limiting, this claim amendment may be acceptable if the invention truly includes some type of data processing apparatus.

Often, accommodating § 101 computer software rejections may be as simple as that described above. In issuing the rejection, the Examiner may simply be trying to build a prosecution file record.[15] In such cases, the simple claim amendments suggested above will usually be sufficient to overcome the rejection, since they more clearly place the claims in a statutory category.

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[15] The Director of USPTO Examining Group 2300 has promulgated written instructions that a § 101 rejection should be issued whenever the statutory subject matter nature of a computer software claim is in issue. The Director's instructions state that: "If the claim is the least bit suspect regarding the 101 question - make the rejection. At least the record in the application will be clear that we considered this question. Applicant will probably amend his claims to clearly place them in a statutory category . . . ." D.C. Toedt, III, "Software Patent Controversies Lead to Different Outcomes in the Federal Circuit, PTO," *The Computer Lawyer*, Vol.9, No. 7, p.18 (1992)(quoting Director Gerald Goldberg).

Of course, it is not always so easy to overcome § 101 computer software rejections. In such cases, more substantial claim amendments are necessary to overcome the rejection. Such amendments could include tying the claimed subject matter to a particular physical arrangement and/or particular physical components. Other amendments could include reciting the claimed subject matter in terms of transforming physical entities (such as electrical signals in a computer) from one state to other states.

It has been our experience that it is very difficult to accommodate § 103 rejections of computer program product claims while still maintaining the claims in the computer program product format. In light of the current posture of the USPTO, we recommend canceling any computer program product claim *unless* your client is prepared to appeal from an adverse decision of the Examiner to the Board of Patent Appeals and Interferences. Similarly, if your client is willing to go to the Board, then for efficiency and timeliness purposes we recommend appealing at the earliest possible opportunity, i.e., after the claims have been twice rejected and any § 112 rejections have been overcome.

Successful accommodation of objections and rejections based on § 112, first and second paragraphs, usually follow directly from the successful accommodation of the underlying § 101 statutory subject matter rejection. For example, if in accommodating the § 101 rejection you have amended the claims such that they recite a computer implemented method or a computer system, then you have simultaneously accommodated the § 112 objections and rejections since the claims no longer allegedly read solely on a computer program.

4. Conducting an Examiner Interview

The benefits of conducting an Examiner interview have been well documented.[16] Some of the benefits of the interview are as follows: (a) an interview makes the invention come alive to the Examiner; (b) an interview creates the proper atmosphere for negotiating your position; and (c) building a rapport with the Examiner can aid the patent attorney in not only the patent application at hand, but others in the future.

With regard to § 101 rejections, the interview can be an invaluable tool in prosecuting your clients' patent applications. It is frequently difficult to assess from the Office Action itself what specifically troubles the Examiner with regard to § 101. As discussed above, the Examiner is oftentimes giving the § 101 rejection to comply with internal USPTO policy. In this situation, the rejection can typically be overcome by a simple argument or an amendment to the claims. On the other hand, this type of rejection sometimes cannot be overcome regardless of the

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[16] *See, e.g.,* Smith, "Negotiating with Patent Examiners" *JPTOS* Vol. 72, N0. 2, 1990.

concessions made by the applicant. The interview helps gauge the Examiner's position, so that the patent attorney can draft an appropriate response.

We believe that an in-person interview is more effective than a telephone interview with the Examiner. To begin with, demonstrations are impossible if a telephone interview is conducted. It is our experience that a physical demonstration (if possible) can aid the patent attorney in overcoming § 101 rejection. The demonstration makes the invention come alive to the Examiner, and helps demonstrate the fact that the invention is not a mathematical "algorithm." If possible, bring a portable computer to the interview with the software already loaded. Test the program ahead of time so that you become thoroughly familiar with it - and its limitations. Furthermore, as in any negotiation, in-person contact with the opposing side is critical in conveying your thoughts and feelings. It is more difficult for the Examiner to sidestep the issues. Also, in an in-person interview, the patent attorney can better prevent an atmosphere of animosity from arising.

The key to a successful interview is preparation. There is nothing an Examiner dislikes more than a patent attorney on a fishing expedition for information. The patent attorney must be prepared to negotiate and discuss his position, and not expect the Examiner to explain how the case can be allowed. The patent attorney must have different arguments and possible claim amendments to present to the Examiner. Although this advice applies to all interviews, it is especially true in interviews involving § 101. Unless the patent attorney is prepared to appeal the Examiner's decision to the Board of Patent Appeals and Interferences, he must be ready to compromise his position somewhat. In order to be ready to make compromises that are in the best interest of their client, the patent attorney must be prepared for the interview.

One final note on interviews: the patent attorney should regularly prepare proposed claim sets for the interview. If one of the proposed claim sets is accepted by the Examiner during the interview, it can be attached to the interview summary record. It is not recommended, however, to have all the discussed claims sets attached to the interview summary record. This might create an unnecessary prosecution history estoppel.

5. Appealing From an Adverse Decision of the Examiner

We recommend taking all possible and reasonable steps to reach agreement with the Examiner on the nature and scope of the allowable subject matter. However, if after taking such steps the Examiner's decision remains adverse to your client's position, then an appeal to the Board of Patent Appeals and Interferences may be necessary.

Before appealing any case, the practitioner should develop a strong set of claims to rely on in the appeal process. This should be performed by incorporating structural language into the claims wherever possible and amending the preamble of the claim to point out the substance

of the invention. This will help support the argument that the invention performs a useful "inventive" function, rather than an attempt to hide a pure mathematical algorithm by the attorney through clever draftsmanship.

6. Conclusion

It is important to understand and believe that Section 101 rejections can be overcome. To do so, it is necessary to properly manage the prosecution process and to fully understand the invention. The process begins with the question: What is the invention? It ends with a claim that defines the invention in a manner that circumscribes only the means or steps that occur within an electronic device - a computer. As long as the invention is something under the sun that is made by man, it then becomes a matter of properly drafting the claims to cover only that which is made by man.

The concurring opinion by Judge Rader in *Arrhythmia* should be a guide. The fact that an invention is implemented in hardware or software should be of no moment. The real issue is whether the otherwise properly claimed invention is novel and unobvious. As long as the claims are directed to a computer implemented invention, that should be the only issue.