

2007-1130

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**UNITED STATES COURT OF APPEALS**  
**FOR THE FEDERAL CIRCUIT**

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In re Bernard L. Bilski and Rand A. Warsaw

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APPEAL FROM THE UNITED STATES PATENT AND TRADEMARK  
OFFICE BOARD OF PATENT APPEALS AND INTERFERENCES

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**BRIEF FOR *AMICUS CURIAE* PROFESSOR LEE A. HOLLAAR IN  
SUPPORT OF NEITHER PARTY**

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April 3, 2008

## CERTIFICATE OF INTEREST

Counsel for Amicus Curiae Professor Lee A. Hollaar certifies the following:

1. The full name of every party represented by us is:

Professor Lee A. Hollaar

2. The name of the real parties in interest represented by us is:

Professor Lee A. Hollaar

3. All parent corporations and any public companies that own 10 percent or more of the stock of the party represented by us are:

None

4. The names of all law firms and the partners or associates that appeared for the parties now represented by me in the trial court or are expected to appear in this court are:

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## TABLE OF CONTENTS

STATEMENT OF INTEREST OF AMICUS CURIAE .....	1
ARGUMENT .....	2
Process Claims.....	3
Quotes in Context .....	7
Even Machines Implemented with Software Are Patentable.....	9
“Particularly Pointing Out and Distinctly Claiming” .....	13
Why Not Allow Patents On Any Activity? .....	19
CONCLUSION.....	25

## TABLE OF AUTHORITIES

### *Cases*

<i>AT &amp; T Corp. v. Excel Communications Inc.</i> , 172 F.3d 1352, 50 U.S.P.Q. 2d 1447 (Fed. Cir. 1999) .....	4, 7
<i>Cochran v. Deener</i> , 94 U.S. 780 (1876) .....	3
<i>Diamond, Commissioner of Patents and Trademarks v. Chakrabarty</i> , 447 U.S. 303, 206 U.S.P.Q. 193 (1980) .....	9
<i>Diamond, Commissioner of Patents and Trademarks v. Diehr and Lutton</i> , 450 U.S. 175, 209 U.S.P.Q. 1 (1981) .....	2, 4, 7
<i>Gottschalk, Commissioner of Patents v. Benson et al.</i> , 409 U.S. 63, 175 U.S.P.Q. 673 (1972) .....	10, 14
<i>In re Alappat</i> , 33 F.3d 1526, 31 U.S.P.Q. 2d 1545 (Fed. Cir. 1994) .....	8, 11
<i>In re Bridgeford</i> , 357 F.2d 679, 149 U.S.P.Q. 55 (CCPA 1966) .....	18
<i>Parker, Acting Commissioner of Patents and Trademarks v. Flook</i> , 437 U.S. 584, 198 U.S.P.Q. 193 (1978) .....	17
<i>Sitrick v. Dreamworks LLC</i> , 85 U.S.P.Q. 2d 1826 (Fed. Cir. 2008) .....	18
<i>State Street Bank &amp; Trust Co. v. Signature Financial Group Inc.</i> , 149 F.3d 1368, 47 U.S.P.Q. 2d 1596 (Fed. Cir. 1998) .....	4, 6, 7
<i>Whelan Associates Inc. v. Jaslow Dental Laboratory, Inc., et al.</i> , 797 F.2d 1222, 230 U.S.P.Q. 481 (3d Cir. 1986) .....	10

### *Federal Statutes*

35 U.S.C. § 112 .....	13, 14, 15
35 U.S.C. § 271(a) .....	20

17 U.S.C. § 102(b) ..... 10

***Federal Regulations***

37 C.F.R. § 41.37(c)(1)(v) ..... 15

***Other Sources***

James Bessen and Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovation at Risk*, Princeton University Press, 2008 ..... 15

Ben Klemens, *Math You Can't Use: Patents, Copyright and Software*, Brookings Institution Press, 2005 ..... 10

Andrew Knight, "A Potentially New IP: Storyline Patents," *Journal of the Patent and Trademark Office Society*, Vol. 86, No. 11, pp. 859-877 (November 2004) ..... 24

Reply Brief of Appellants ..... 8

S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952) ..... 8

Kenneth L. Thompson, "Text Matching Algorithm," United States Patent 3,568,156, granted March 2, 1971 ..... 13

Transcript of Oral Argument, *LabCorp v. Metabolite Labs*, No. 04-607 (S.Ct. Mar. 21, 2006) ..... 9

Transcript of Oral Argument, *Quanta Computer v. LG Electronics*, No. 06-937 (S.Ct. Jan. 16, 2008) ..... 22

Uniform Commercial Code, § 2-312(3) ..... 21

**STATEMENT OF INTEREST OF AMICUS CURIAE**

*Amicus* files this brief pursuant to the Court's order of February 15, 2008.

Lee A. Hollaar is a professor of computer science in the School of Computing at the University of Utah, where he teaches courses in computer and intellectual property law and computer systems and networking. He has been programming computers since 1964 and designing computer hardware since 1969. He received his B.S. degree in electrical engineering from the Illinois Institute of Technology in 1969 and his Ph.D. in computer science from the University of Illinois at Urbana-Champaign in 1975.

Dr. Hollaar is the former chair of IEEE-USA's Intellectual Property Committee, where he supervised the filing of the amicus brief whose theory of foreseeability was adopted by the Supreme Court in *Festo*, and filed an amicus brief on his own behalf in *Grokster* whose theory of inducement liability was also adopted by the Supreme Court.

As an inventor and patentee of computer-related technology, a Registered Patent Agent involved with the prosecution of patent applications since 1989, an expert witness and special master in patent litigation, the author of *Legal Protection of Digital Information* (BNA Books, 2002) and course material on computer-based patents, and teacher of that material, he

is concerned that the decision in this case might continue the unclear lines of what is statutory subject matter by making distinctions not tied to real technological differences or may force inventors of computer-program-based inventions to claim them in ways that obscure the patentable advance over the prior art.

The views expressed here are solely those of Professor Hollaar.

### ARGUMENT

In the over three decades since Diehr and Lutton first applied for a patent on a method of using a digital computer to control a rubber molding press<sup>1</sup> that the Supreme Court held claimed a statutory process,<sup>2</sup> the use of computer technology has expanded well beyond the (presumably novel and nonobvious) use of an expensive digital computer to control an industrial process to being present in most consumer electronics and appliances. Microwave ovens, washers and dryers, television sets and radios, thermostats, furnaces and boilers, sprinkler controllers, and clocks and watches are but a few of the appliances where an embedded computer has replaced mechanical timers, gears, and switches, resulting in more reliable products able to perform more functions at lower prices.

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<sup>1</sup> Resulting in United States Patent 4,344,142, "Direct digital control of rubber molding presses," issued August 10, 1982.

<sup>2</sup> *Diamond, Commissioner of Patents and Trademarks v. Diehr and Lutton*, 450 U.S. 175, 209 USPQ 1 (1981).

Many of the new capabilities for such appliances are the result of novel and nonobvious computer programs that control traditional machines in ways that cannot be realistically done using mechanical controls. Much as Diehr and Lutton's invention sensed the actual tire mold temperature and determined what to do next, today's microwave ovens sense the temperature of meat being cooked and dryers sense the moisture content of the clothes.

### *Process Claims*

Before the advent of computer technology, process claims in patents were used primarily to claim a new way of producing a known machine, manufacture, or composition of matter, the other classes of statutory subject matter. The first patent granted by the United States, in 1790, was for a new process for making potash. In *Cochran v. Deener*, 94 U.S. 780 (1886), the Supreme Court stated:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. \* \* \* A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain



substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.”<sup>3</sup>

In *Diamond v. Diehr*, the Supreme Court held that just because “in several steps of the process a mathematical equation and a programmed digital computer are used,” the claimed “physical and chemical process for molding precision synthetic rubber products falls within the §101 categories of possibly patentable subject matter.”<sup>4</sup>

A series of decisions by this Court and its predecessor, culminating in *State Street Bank*<sup>5</sup> and *AT&T*,<sup>6</sup> expanded the process claims beyond the physical transformation of an article.

*State Street Bank* shouldn’t have been about process claims at all. Signature had originally filed twelve claims – six method claims and six corresponding machine claims. When the examiner objected to the method claims as not being statutory subject matter, Signature dropped them in the interest of getting its patent. The examiner then allowed the patent for the remaining machine claims. Claim 1 is representative of the machine claims,

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<sup>3</sup> 94 U.S. 780, 787-788 (1876), cited in *Diamond v. Diehr*, 450 U.S. at 182-183, 209 USPQ at 6.

<sup>4</sup> 450 U.S. at 184-185, 209 USPQ at 7.

<sup>5</sup> *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998).

<sup>6</sup> *AT & T Corp. v. Excel Communications Inc.*, 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999).

with the bracketed language indicating what the written description discloses as structure for the “mean for” limitations.

1. A data processing system for managing a financial services configuration of a portfolio established as a partnership, each partner being one of a plurality of funds, comprising:

(a) computer processor means [a personal computer including a CPU] for processing data;

(b) storage means [a data disk] for storing data on a storage medium;

(c) first means [an arithmetic logic circuit configured to prepare the data disk to magnetically store selected data] for initializing the storage medium;

(d) second means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on 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.<sup>7</sup>

Clearly, the claim is to a specific machine, albeit one that may be implemented using a conventional digital computer. But through some legerdemain, the district court transformed the machine claims into method claims (much like the ones that had been dropped by Signature during the prosecution of the application), and then said the claimed subject matter was an unpatentable abstract idea or, alternatively, a business method, and therefore not patentable.

This Court properly condemned the “business method exception” as “ill-conceived,” noting that:

Since its inception, the “business method” exception has merely represented the application of some general, but no longer applicable legal principle, perhaps arising out of the “requirement for invention” – which was eliminated by Section 103. Since the 1952 Patent Act, business methods have been, and should have been, subject to the same legal requirements for patentability as applied to any other process or method.<sup>8</sup>

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<sup>7</sup> *State Street Bank*, 149 F.3d at 1372, 47 USPQ2d at 1600.

<sup>8</sup> *State Street Bank*, 149 F.3d at 1375, 47 USPQ2d at 1602.

In AT&T, the claim really was written as a method, tied to a telecommunication system. Although nothing physical was being transformed, this Court noted:

The notion of “physical transformation” can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, “when [a claimed invention] 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), then the claim satisfies the requirements of Section 101.” *Diehr*, 450 U.S. at 192 (emphasis added). The “*e.g.*” signal denotes an example, not an exclusive requirement.<sup>9</sup>

### ***Quotes in Context***

Appellants ignore the context of both State Street Bank (which, after all, was for a claimed machine and not a process at all) and AT&T, and ask this Court to extend those decisions to any activity that can produce any “useful, concrete, and tangible result” even if it does not involve a machine (as in State Street Bank) or a machine implemented process (as in AT&T). But that language, as used in State Street Bank,<sup>10</sup> was in the context of a machine. That is also true for *Alappat*, the case where the quote originated.

This is not a disembodied mathematical concept which may be characterized as an “abstract idea,” but rather *a specific*

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<sup>9</sup> *AT&T*, 172 F.3d at 1378-1379, 50 USPQ2d at 1452.

<sup>10</sup> *State Street Bank*, 149 F.3d at 1373, 47 USPQ2d at 1600-1601.

*machine* to produce a useful, concrete, and tangible result.<sup>11</sup>  
(Emphasis added.)

In fact, Appellants have been quite good at quoting things out of context to support their proposition. They state that:

The “anything under the sun” phrase comes directly from the Report from the Committee on the Judiciary House of Representatives, May 12, 1952. Clearly, there was no attempt by Congress to limit the subject matter under § 101 to only processes earlier found patentable.<sup>12</sup>

But what Congress really said was:

A person may have “invented” a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.<sup>13</sup>

In other words, if something is man-made, it is either a machine or manufacture. Congress clearly *did not* say that anything made by man – or, with respect to Appellants’ claim, *done* by man – was patentable subject matter.<sup>14</sup>

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<sup>11</sup> *In re Alappat*, 33 F.3d 1526, 1544, 31 USPQ2d 1545, 1557 (Fed. Cir. 1994).

<sup>12</sup> Reply Brief of Appellants, at 6.

<sup>13</sup> S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952).

<sup>14</sup> As Justice Breyer noted during oral arguments in *LabCorp v. Metabolite*:

I mean, I can't resist pointing, as one of these briefs did, the phrase anything under the sun that is made by man comes from a committee report that said something different. It said a person may have invented a machine or a manufacture, which may include anything under the sun that is made by man.

And when the Supreme Court quoted that sentence in *Chakrabarty*,<sup>15</sup> it was in the context of determining whether a bacterium with the property of breaking down multiple components of crude oil, a property which was not possessed by any natural occurring bacteria, was a statutory article of manufacture. (It was.)

So that this doesn't happen in future cases, it is important that this Court make the context of anything that might later be a good "sound bite" abundantly clear.

***Even Machines Implemented with Software Are Patentable***

Some may take this opportunity of an *en banc* hearing of this Court to argue that not only should Appellants' process claims be unpatentable, but so should any claim that involves computer software. Not only should *State Street Bank* and *AT&T* be reconsidered and overruled, but also all the other "misguided" decisions of this Court and its predecessor regarding the patentability of software-based inventions. Given the fact that many

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So referring to that doesn't help solve the problem where we're not talking about a machine or a manufacture.

Transcript of Oral Argument, *LabCorp v. Metabolite Labs*, No. 04-607 (S.Ct. Mar. 21, 2006), available at [http://www.supremecourtus.gov/oral\\_arguments/argument\\_transcripts/04-607.pdf](http://www.supremecourtus.gov/oral_arguments/argument_transcripts/04-607.pdf), at 43.

<sup>15</sup> *Diamond, Commissioner of Patents and Trademarks v. Chakrabarty*, 447 U.S. 303, 309, 206 USPQ 193, 197 (1980).

improvements to machines today are the result of the software on the embedded processor that controls the machine, however, such a radical action would take a major area of innovation out of the patent system.<sup>16</sup>

One argument the opponents of patents for software-based inventions make is that software is mathematics, and mathematics is not patentable.<sup>17</sup> But that not only ignores how software-based inventions are generally claimed, but is bad computer science. Often, those making that argument point to Turing machines<sup>18</sup> and their correspondence to Church's lambda calculus to bridge the gap between software and mathematics.<sup>19</sup> But most claimed software-based inventions cannot run on a Turing machine, even though it is regarded as a "universal" computer, because it is a hypothetical

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<sup>16</sup> Saying that computer software can be protected by copyright is not sufficient, since copyright protection does not "extend to any idea, procedure, process, system, [or] method of operation," 17 U.S.C. § 102(b), the very innovation that patents protect. Instead, today it is essentially limited to protection against literal copying or taking advantage of source code from a former employer. But before patents on software-based inventions became common, courts were expanding the nonliteral scope of copyright to "structure, sequence, and organization" of computer programs, see *Whelan Associates Inc. v. Jaslow Dental Laboratory, Inc., et al*, 797 F.2d 1222, 230 USPQ 481 (3d Cir. 1986), giving patent-like protection without the benefit to the public of disclosure and claiming.

<sup>17</sup> *Gottschalk, Commissioner of Patents v. Benson et al.*, 409 U.S. 63, 175 USPQ 673 (1972) is generally cited for the latter proposition.

<sup>18</sup> Named for the English mathematician Alan M. Turing, who was a pioneer in computer science, cryptograph, and theory of computation.

<sup>19</sup> See, for example, Ben Klemens, *Math You Can't Use: Patents, Copyright and Software*, Brookings Institution Press, 2005.

device with little or no input-output facilities and whose only memory is an infinite-length tape that has to be positioned to read a particular item.

Claims that include data structures in random-access memories, input devices such as keyboards or mice, screen display devices, or clocks and time-outs, common in software-based patents, all would require substantial extensions to the hypothetical Turing machine to be performed. And with those extensions, a Turing machine would change into a conventional digital computer, no longer equivalent to pure mathematics.

A far better way to understand the nature of software on a general purpose computer was given by this Court in *Alappat*:

We have held that such programming creates a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software.<sup>20</sup>

This continues to be an excellent description of the role of software in the control of a software-based machine. The computer program running on the embedded processor on an appliance such as a washing machine turns that embedded processor into a special-purpose washing machine controller, replacing the mechanical controller of past washing machines. Because of the power and flexibility of the embedded controller allows the washing

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<sup>20</sup> *In re Alappat*, 33 F.3d 1526, 1545, 31 USPQ2d 1545, 1558 (Fed. Cir. 1994).



machine to perform functions that would be impractical using a conventional controller with motors and gears and cams and other mechanical things, that would clearly be patentable if novel and nonobvious.

The idea that a general-purpose computer becomes a special-purpose computer when it is programming also mirrors the language of, and finds strong support in, computer science. It is common to regard a computer system as a series of layers, each regarded as a particular “machine” based on the programming in lower layers. For example, a microprocessor running the Microsoft Windows operating system can be regarded by the applications programmer as a “Windows” computer, since it is programmed using a subset of the machine instructions of the microprocessor (the ones that could have harmful effects to an operating system are not available to applications) and new “instructions” in the form of the Windows Application Program Interfaces (APIs). If the application program is a Java bytecode interpreter, then the “Windows” computer becomes a Java Virtual Machine, with its own instruction set and APIs.

Too often, artificial distinctions not grounded in computer science (or reality) have been made to try to explain why some things are patentable and

but similar things are not.<sup>21</sup> This has made it difficult to understand the boundaries of patent protection for software-based inventions.

The “general-purpose computer plus program equals special-purpose computer” formulation of this Court is good computer science and should be continued. And, of course, such a special-purpose computer is a patentable machine if it is novel and nonobvious.

***“Particularly Pointing Out and Distinctly Claiming”***

The question is how such a special-purpose machine should be claimed, particularly to meet the statutory requirement that:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.<sup>22</sup>

The obvious way to claim such a special-purpose computer is as a machine or apparatus. This is what was done, for example, in the first claim of an early patent for a software-based invention:<sup>23</sup>

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<sup>21</sup> For example, a compact disc may be a patentable article of manufacture if the bits on it are “functional,” such as a computer program, but not if they are music. But there is no physical difference between a computer program CD and a music CD. And a Adobe PostScript file, which most people regard as a formatted document file for printing, is really a computer program written in the PostScript programming language.

<sup>22</sup> 35 U.S.C. § 112, second paragraph.

<sup>23</sup> Kenneth L. Thompson, “Text Matching Algorithm,” United States Patent 3,568,156, granted March 2, 1971, and assigned to Bell Telephone Laboratories. Ken Thompson is one of the principal creators of the Unix operating system.

1. Apparatus for detecting matches between strings of information-representing signals comprising:

[a] means for comparing each subunit of a first string to the first subunit of a second string;

[b] means for recording the identification of that subunit of the second string which subunit follows each matched subunit of the first string;

[c] means for comparing each identified subunit of the second string to the next succeeding subunit of the first string;

[d] means for indicating a successful match when all subunits of the second string are compared; and

[e] means for indicating an unsuccessful match when all subunits of the first string are compared.

Since the elements of the claimed apparatus are in means-plus-function form, we have to look to the specification to see what is really being claimed.<sup>24</sup> And what we find is two very different implementations of the claimed special-purpose machine – the first in conventional digital logic of the period (DEC “Flip Chip” modules) and the second as assembly-language program segments for the IBM 7094 computer.<sup>25</sup>

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<sup>24</sup> See 35 U.S.C. § 112, sixth paragraph:

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

<sup>25</sup> Presumably it was claimed this way to make the examiner see statutory subject matter (at least the digital logic) and then leverage that into a patent

Such a claim is undesirable because it is not clear on its face what is covered by the patent. One has to read through the specification and guess what structure corresponds to each functional element<sup>26</sup> and what may be equivalent to the structure in the specification.

A recent book<sup>27</sup> posits that a major problem with patents today is that it is difficult for people to determine what is covered by a patent, and this lack of a predictable property right produces uncertainty for developers and costly disputes that may outweigh the positive incentives of the patent system. The authors' research found that only in some sectors of technology,

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on the software implementation, both through claim 1 and a corresponding method claim 2. This application was filed at the time that Bell Labs was trying to determine the patentability of computer-based inventions. Another application that they filed became the subject of *Gottschalk, Commissioner of Patents v. Benson et al.*, 409 U.S. 63, 175 USPQ 673 (1972).

<sup>26</sup> It is not necessary for the applicant to indicate the corresponding structure in the specification for a claim element to the examiner, and examiners seldom indicate what they considered the corresponding structure. The Board of Patent Appeals and Interferences does require that:

every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters.

37 C.F.R. § 41.37(c)(1)(v). Because of that, every appeal coming to this Court from the Board will have the corresponding structure identified. But that is not the case for patents that have not been appealed to the Board.

<sup>27</sup> James Bessen and Michael J. Meurer, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovation at Risk*, Princeton University Press, 2008.

such as the pharmaceutical industry, do patents act as advertised, with their benefits outweighing their costs, while for the software, the lack of clear claiming has a definite negative effect.

Software-based inventions can be claimed in a more straightforward manner using method claims, where the elements of the claims are the steps of the method performed by the new software technique. This way of claiming simplifies the examination of the application, because it concentrates on the new method that is the heart of the invention. For example, the claim above rewritten as a method claim would be:

2. The method of detecting matches between strings of electronically coded subunits comprising the steps of:

[a] comparing each subunit of a first string to the first subunit of a second string;

[b] recording the identification of that subunit of the second string following each matched subunit of the first string;

[c] comparing each identified subunit of the second string to the next succeeding subunit of the first string;

[d] indicating a successful match when all subunits of the second string are compared; and

[e] indicating an unsuccessful match when all subunits of the first string are compared.

Not only does the use of the process claim not require that the specification be consulted to find corresponding structure to determine the scope of the claim, but it is infringed not when some collection of parts

capable of performing the claimed method happen to come together in one machine, perhaps from different programs, but when the new method is actually performed.<sup>28</sup>

This is clearly not the type of clever claiming the Supreme Court warned about when it said:

A competent draftsman could attach some form of post-solution activity to almost any mathematical formula; the Pythagorean Theorem would not have been patentable, or partially patentable, because a patent application contained a final step indicating that the formula, when solved, could be usefully applied to existing surveying techniques.<sup>11</sup> The concept of patentable subject matter under §101 is not “like a nose of wax which may be turned and twisted in any direction \* \* \*.”<sup>29</sup>

Instead, it is more like a product-by-process claim, where a novel and nonobvious manufacture or composition of matter is claimed by claiming a process that creates the product.

A product-by-process type claim defining an article of manufacture was permitted at least as early as 1891 in *Ex parte*

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<sup>28</sup> For those wanting to catch people constructing the special-purpose computer created by the method, a dependent claim such as “A digital computer system programmed to perform the method of claim N” can be used. Similarly, an article of manufacture claim to catch those producing the disks used to distribute an implementation of the method a claim like “A computer-readable medium storing a computer program implementing the method of claim N” can be used. With both, the examiner can concentrate on determining the novelty and nonobviousness of the claimed method, and then simply check to see that the dependent claims are in the proper form.

<sup>29</sup> *Parker, Acting Commissioner of Patents and Trademarks v. Flook*, 437 U.S. 584, 590, 198 USPQ 193, 197 (1978).