

*STATE STREET BANK IN THE CONTEXT OF THE SOFTWARE  
PATENT SAGA\**

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INTRODUCTION

Networked computer technology, principally the Internet, influences business and life in general to an extent not seen since the Industrial Revolution. While applicable intellectual property law often lags behind such dramatic technological developments considerably, *State Street Bank*<sup>1</sup> is surprisingly timely. Certainly its impact on computer-implemented business methods is highly significant, particularly in the present environment where computerization dominates so much of new business development.<sup>2</sup> In addition, the case appears to have had an extraordinary impact for a decision of a single panel of the Federal Circuit.<sup>3</sup> This impact raises

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\* Judge Giles S. Rich, author of the *State Street Bank* opinion, died on June 9, 1999, shortly after his 95th birthday. Judge Rich was a giant in the patent profession and one of its principal architects. He served first as a patent attorney and participated in drafting the current law, known as the 1952 Patent Act. He was appointed to the bench by President Eisenhower in 1956, serving first on the CCPA and then on the Federal Circuit upon its creation in 1982. Despite his advanced age, Judge Rich never took senior status and served actively until his death. The story of this paper is in many ways the story of Judge Rich and his views regarding the patentability of software-related inventions. His belief, in essence, reflected in many of his opinions referred to in this paper, was that software-related inventions should not be considered different from other types of inventions from the standpoint of patentability. It is certainly appropriate that during his unusually long career as a jurist, he was able to complete in the *State Street Bank* opinion the legal story of software patentability begun more than three decades ago in the *Prater* case.

The authors wish to dedicate their work to the memory of Judge Rich and to his vision of the patent law as it applies to software-related inventions.

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<sup>1</sup> *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d (BNA) 1596 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

<sup>2</sup> *See, e.g.*, Steven L. Friedman et al., *State Street Bank and Trust Company v. Signature Financial Group Inc. at the Intersection of Technology, Commerce and the Law*, IPL NEWSLETTER, Spring 1999, at 8, 15.

<sup>3</sup> United States Court of Appeals for the Federal Circuit. The panel in *State Street Bank* consisted of Judges Rich, Plager and Bryson.

questions as to whether *State Street Bank* is merely a fluke or whether it is consistent with the trend and tradition of the law on patenting software-related inventions. The question also remains whether *State Street Bank* will remain a strong Federal Circuit precedent for other panels to follow.

In this article, we delve into these questions by exploring the traditions that gave rise to *State Street Bank*. We consider the three-decade-long series of judicial opinions that address patenting computer software, and more particularly, patenting claims including mathematical algorithms.<sup>4</sup> This series of opinions extends from the origins of commercial software use to the present. In these opinions, we see a judicial process leading to the *State Street Bank* opinion that develops like the flow of a river—quickly at first, slowed by obstacles placed in its path, meandering, yet inexorably gaining strength, broadening, and finally defining a sea-change.

This sea-change, traced through judicial decisions, is really the story of a multi-decade long, titanic struggle waged between the executive and judicial branches of the government. These branches have battled over the scope of 35 U.S.C. § 101 of the Patent Act,<sup>5</sup> which defines patentable subject matter. More specifically, the executive branch, represented by the United States Patent and Trademark Office (PTO), sought to discourage patent applications for software-related inventions by choosing to find such inventions outside the scope of section 101.<sup>6</sup>

## I. BACKGROUND

It may seem strange that the very agency charged with carrying out the Constitutional mandate of issuing valid patents and rewarding inventors for the fruits of their labor would actively discourage patent applications on such an important class of inventions as those based on computer

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<sup>4</sup> Software is fundamentally a sequence of logical instructions that enable a computer to solve a problem or provide a desired output from input data. Computers operate solely on the basis of numerical calculations, and thus, the logical instructions must constitute mathematical operations. Consequently, software can be described as a mathematical algorithm, i.e., a process for solving a problem using mathematics.

<sup>5</sup> 35 U.S.C. § 101 (1994). To receive patent protection, an inventor must meet several statutory requirements, under sections 101-103 including the requirements of utility, novelty and nonobviousness (i.e., the invention must be useful, new and not an obvious variation of existing technology). *Id.* §§ 101-103. Section 101 sets forth the four categories of patentable subject matter as follows: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor." *Id.* § 101.

<sup>6</sup> See, e.g., The Honorable Edward J. Brenner, Commissioner of Patents, *The Future of Computer Programs in the United States Patent Office*, in *THE LAW OF SOFTWARE: 1968 PROCEEDINGS*, B-10 (Computers-In-Law Institute, 1968).

software. Yet the PTO had compelling reasons for doing exactly that prior to the Supreme Court's landmark decision in *Gottschalk v. Benson*.<sup>7</sup>

#### A. *The Pre-Benson Era*

The 1960's saw the dawning of the age of digital computer as commercial tools. New processes requiring lightning fast calculations were developed, requiring computers that could process numbers much faster than a human possibly could. Control of the computers required software design advances.

During the mid-60's, the PTO was well aware of the rapid advances in software technology,<sup>8</sup> as well as the difficulty posed by the need to examine the growing influx of software-related patent applications.<sup>9</sup> Few examiners had software experience and it was extremely difficult for the PTO to hire more.<sup>10</sup> Worse yet, PTO officials anticipated a deluge of applications that would swamp the examining corps unless it discouraged software applications.<sup>11</sup>

These were serious problems for the PTO in the 60s for two important reasons. First, at the time, the government viewed patents as a tool relied upon by big business to squelch competition.<sup>12</sup> As a result, government policy (outside the PTO) focused more on enforcing the antitrust laws and instituting patent antitrust policies rather than on encouraging innovation.<sup>13</sup> Second, given this prevailing attitude, the PTO knew that it was unlikely to obtain the increased federal subsidy<sup>14</sup> necessary to create the new search files and to hire the new examiners needed to handle the projected deluge

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<sup>7</sup> *Gottschalk v. Benson*, 409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972).

<sup>8</sup> See, e.g., Brenner, *supra* note 6, at B-1.

<sup>9</sup> See *id.* at B-6, B-12.

<sup>10</sup> See *id.* at B-12 to B-13. Prior art in the software field was rare or non-existent because of the tradition of secrecy relied upon by programmers. See *id.* at B-13.

<sup>11</sup> See *id.* at B-6, B-12.

<sup>12</sup> See, e.g., Roger B. Andewelt, *Antitrust Perspective on Intellectual Property Protection*, 30 PAT., TRADEMARK, & COPYRIGHT J. (BNA) 319 (1985); Lawrence G. Kastriner, *The Revival of Confidence in the Patent System*, 73 J. PAT. [& TRADEMARK] OFF. SOC'Y 6 (1991).

<sup>13</sup> See, e.g., David T. Silverstein, *Patents, Science, and Innovations: Historical Linkages and Implications for Global Technological Competitiveness*, 25 RUTGERS COMPUTER & TECH L. J. 261, 302-08 (1991) (attributing the decline of the patent system during the 1950's, 1960's and 1970's to the federal government's aggressive antitrust enforcement during that period).

<sup>14</sup> At the time, the PTO was not fully self-supported through user fees. See Brenner, *supra* note 6, at B-12. In his 1968 address to the Computers-in-Law Institute, the Commissioner of Patents stated, "The present [Patent] Office policy of refusing patents in [the computer programming] field has acted as a strong deterrent to the filing of applications. Should this policy be reversed it seems almost certain that the persons and concerns interested would feel called upon to file a large number of applications . . . It has been estimated that the number of such applications might well be in the thousands." *Id.* Fees were not set on a cost recovery basis, there was no concept of charging maintenance fees, and the low probability of increasing its federal subsidy left the PTO no option other than the attempt to limit application filings.

of software applications.<sup>15</sup> The practical impact of its strategic, fiscal and budgetary constraints led the PTO to adopt a policy of instructing its examiners to reject claims to software-related inventions.<sup>16</sup> The PTO Board of Appeals (Board), acting in accord with this policy, generally upheld these rejections.<sup>17</sup>

Naturally, this policy drove software applicants to appeal the Board's software claim rejections<sup>18</sup> to the friendlier environment of the Court of Customs and Patent Appeals (CCPA).<sup>19</sup> The CCPA was a friendlier atmosphere for patent applicants because it had no concerns with PTO fiscal or budgetary problems. Rather, the CCPA rendered its opinions based entirely upon the relevant law and legal precedent.

### 1. The Struggle Over Software Patentability Begins

The PTO resisted the patentability of computer implemented process claims, relying in part on the "mental steps" doctrine.<sup>20</sup> Starting in 1968,

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<sup>15</sup> Edward J. Brenner, former Commissioner of Patents, noted in his 1968 address to the Computers-in-Law Institute of the George Washington University, "It is proper to note that a general acceptance of computer programs as patentable subject matter would, in all probability, impose upon the Patent Office a tremendous burden which the Office is in a poor position to sustain." Brenner, *supra* note 6, at B-12.

<sup>16</sup> See Official Gazette of August 16, 1966, 829 O.G. 865, 866 (1966) ("In summary, a process carried out by a programmed apparatus is (a) non-statutory where the process as claimed merely states the algorithm and is (b) unpatentable over the prior art where the prior art shows (i.e., makes obvious) all the statutory subject matter although not applied to the same algorithm."). See also Exec. Order No. 11215, 30 C.F.R. 4661 (1965), "To Promote the Progress of . . . the Useful Arts" In an Age of Exploding Technology, Report of the President's Comm'n on the Patent System 12, reprinted in S. DOC. NO. 5, 90th Cong., 1st Sess. at 21 ("[This recommendation] also would eliminate whatever possibility exists under the present statute, if any, for directly or indirectly obtaining a patent covering a program or a patent covering the operation of a data processing machine pursuant to a program.").

<sup>17</sup> The PTO Board of Appeals is an organ of the Commissioner's Office. The Commissioner of Patents and Trademarks nominates the examiners-in-chief who sit on the Board. 35 U.S.C. § 3(a) (1994). The Commissioner, the Deputy Commissioner and Assistant Commissioners, and the examiners-in-chief constitute the Board of Appeals. 35 U.S.C. § 7(a) (1994).

<sup>18</sup> Today, the PTO Board of Appeals is formally named the Board of Patent Appeals and Interferences; however, most practitioners informally refer to the Board of Patent Appeals and Interferences as "the Board." The Board of Patent Appeals and Interferences reviews adverse decisions of patent examiners upon applications for patents. See 35 U.S.C. § 7(b) (1994).

<sup>19</sup> Court of Customs and Patent Appeals. The Court of Appeals for the Federal Circuit (known informally as the "Federal Circuit" and the "CAFC") replaced the CCPA in October 1982. See Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25 (1982).

<sup>20</sup> The "mental steps" doctrine appears to have originated in *Don Lee, Inc. v. Walker*, 61 F.2d 58, 14 U.S.P.Q. (BNA) 272 (9th Cir. 1932), and culminated in *In re Abrams*, 188 F.2d 165, 89 U.S.P.Q. (BNA) 266 (C.C.P.A. 1951). See *In re Prater*, 415 F.2d 1378, 159 U.S.P.Q. (BNA) 583 (C.C.P.A. 1968), modified on reh'g, 415 F.2d 1393, 162 U.S.P.Q. (BNA) 541 (C.C.P.A. 1969). In dicta, the *Abrams* decision referred to the following three "rules" suggested by counsel for the inventor-appellant: (1) if a claimed method consists wholly of "mental" steps, then the subject matter is not patentable, (2) if a claimed method consists of both physical steps and mental steps, and the novel element lies in the mental steps, then the subject matter is not patentable, and (3) if a claimed method consists of both physical steps and mental steps, and the novel element lies in the physical steps, then

the CCPA heard a series of eight appeals from the Board pertaining to the patentability of software-related inventions.<sup>21</sup> In all eight of these cases, the Board had rejected the claims as outside the statutory limitations of section 101, causing the CCPA to confront the “mental steps” exception to patentability.<sup>22</sup>

The first of these early cases considering the patentability of algorithms was *In re Prater*, heard before a panel of judges that interestingly included Judge Rich.<sup>23</sup> In *Prater*, the Board had affirmed a rejection, reasoning that the application’s method claims defined nothing that could not be performed purely as a mental exercise.<sup>24</sup> The CCPA squarely rejected this proposition, holding that the mere fact that a useful process could alternatively be carried out by mental steps did not preclude patent protection for the process.<sup>25</sup> This holding dismissed any notion that “mental-step” claims were unpatentable merely because the novel aspect of the claimed method could also be performed mentally,<sup>26</sup> suggesting an open door for the patentability of novel mathematical processes such as algorithms.

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the subject matter is patentable. 188 F.2d 165, 166, 89 U.S.P.Q. (BNA) 266, 267-68 (C.C.P.A. 1951).

<sup>21</sup> See *In re Waldbaum*, 457 F.2d 997, 173 U.S.P.Q. (BNA) 430 (C.C.P.A. 1972), *modified*, *In re Waldbaum*, 559 F.2d 611, 194 U.S.P.Q. (BNA) 465 (C.C.P.A. 1977); *In re McIlroy*, 442 F.2d 1397, 170 U.S.P.Q. (BNA) 31 (C.C.P.A. 1971); *In re Benson*, 441 F.2d 682, 169 U.S.P.Q. (BNA) 548 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972); *In re Foster*, 438 F.2d 1011, 169 U.S.P.Q. (BNA) 99 (C.C.P.A. 1971); *In re Musgrave*, 431 F.2d 882, 167 U.S.P.Q. (BNA) 280 (C.C.P.A. 1970); *In re Mahony*, 421 F.2d 742, 164 U.S.P.Q. (BNA) 572 (C.C.P.A. 1970); *In re Bernhart*, 417 F.2d 1395, 163 U.S.P.Q. (BNA) 611 (C.C.P.A. 1969); *In re Prater*, 415 F.2d 1378, 159 U.S.P.Q. (BNA) 583 (C.C.P.A. 1968), *modified on reh'g*, 415 F.2d 1393, 162 U.S.P.Q. (BNA) 541 (C.C.P.A. 1969).

<sup>22</sup> Section 101 reflects the long established principle that laws of nature and abstract ideas are not patentable. Software claims often include a mathematical algorithm. The question confronted by the court was whether the patent claims directed to a computer implemented method, including mathematical algorithms, should be considered laws of nature or abstract ideas, and thus, unpatentable.

<sup>23</sup> *In re Prater*, 415 F.2d 1378, 159 U.S.P.Q. (BNA) 583 (C.C.P.A. 1968), *modified on reh'g*, 415 F.2d 1393, 162 U.S.P.Q. (BNA) 541 (C.C.P.A. 1969).

<sup>24</sup> See *id.* at 1382, 159 U.S.P.Q. (BNA) at 587. The Board also upheld the examiner’s rejection of the apparatus claims under 35 U.S.C. § 103 on the grounds that it would have been obvious to one knowing of the applicant’s discovery to program a general purpose computer and thereby arrive at the claimed apparatus. See *id.* at 1389, 159 U.S.P.Q. (BNA) at 593. The CCPA summarily dismissed this grounds for rejection, stating, “[W]e find it impossible to sustain a 103 rejection in a situation where no reference has been cited and where the rejection inherently assumes the availability of applicants’ admittedly novel contribution as knowledge available to one skilled in the art. *Id.*”

<sup>25</sup> See *id.*, 159 U.S.P.Q. (BNA) at 587.

<sup>26</sup> “It will be seen that this statement, which appears to be the genesis of the doctrine of the unpatentability of so-called “mental step” claims, is not only unsupported by any citation of precedent but in its inception was directed to subject matter that was not even novel.” See *id.* at 1387, 159 U.S.P.Q. (BNA) at 591 (referring to the passage in *Don Lee, Inc. v. Walker*, 61 F.2d 58, 67, 14 U.S.P.Q. (BNA) 272, 285 (9th Cir.1932), which is believed to be the origin of the “mental-steps” approach).

The precedential effect of *Prater* was short lived, however. On petition by the Commissioner of Patents, the court granted a rehearing.<sup>27</sup> On rehearing, the court found that all of the method claims in the subject patent were unpatentable under section 112 for failing to particularly point out and distinctly claim the subject matter that the applicants regarded as the invention.<sup>28</sup> The court based the rejection on the applicant's tacit admission in their brief that the method claims covered subject matter beyond what they regarded as the invention.<sup>29</sup> In any case, the CCPA expressly refrained from considering whether the method claims were patentable subject matter under section 101.<sup>30</sup> With regard to the only apparatus claim under consideration on appeal, the court found that a general purpose computer programmed to practice the invention was patentable under sections 102, 103, and 112. The court, however, did not discuss the issue of section 101.<sup>31</sup>

Following the *Prater* rehearing (*Prater II*), another CCPA panel, in *In re Bernhart*, embraced programmed computers as statutory subject matter under section 101.<sup>32</sup> The subject matter in *Bernhart* related to a computerized system for making two-dimensional portrayals of three-dimensional objects.<sup>33</sup> A general purpose computer provided output signals used to control a plotting machine that produced the desired two-dimensional view of the object on paper.<sup>34</sup> Although the panel found only three of the five apparatus claims at issue to be novel and unobvious,<sup>35</sup> all five apparatus claims were found statutory under section 101.<sup>36</sup> The court found that if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program because its memory elements are arranged differently.<sup>37</sup>

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<sup>27</sup> *In re Prater*, 415 F.2d 1393, 162 U.S.P.Q. (BNA) 541 (C.C.P.A. 1969), *modifying* 415 F.2d 1378, 159 U.S.P.Q. (BNA) 583 (C.C.P.A. 1968).

<sup>28</sup> *See Prater*, 415 F.2d at 1404, 162 U.S.P.Q. (BNA) at 550.

<sup>29</sup> *See id.*, 162 U.S.P.Q. (BNA) at 550.

<sup>30</sup> *See id.* at 1405, 162 U.S.P.Q. (BNA) at 551.

<sup>31</sup> *See id.* at 1405-06, 162 U.S.P.Q. (BNA) at 551-52.

<sup>32</sup> 417 F.2d 1395, 163 U.S.P.Q. (BNA) 611 (C.C.P.A. 1969).

<sup>33</sup> *See id.* at 1396, 163 U.S.P.Q. (BNA) at 613.

<sup>34</sup> *See id.*, 163 U.S.P.Q. (BNA) at 613.

<sup>35</sup> *See id.* at 1403, 163 U.S.P.Q. (BNA) at 618.

<sup>36</sup> *See id.* at 1400, 163 U.S.P.Q. (BNA) at 616. The panel also stated that if the novelty defined by a claim does not fit in a statutory class, and all else in the claim is old, then the invention defined by the claim may nonetheless be statutory under 35 U.S.C. § 101. *See id.* at 1399, 163 U.S.P.Q. (BNA) at 615-16.

<sup>37</sup> *See id.*, 163 U.S.P.Q. (BNA) at 616. The panel also determined that the sole method claim at issue defined patentable subject matter under 35 U.S.C. § 101. *Id.* at 1401, 163 U.S.P.Q. (BNA) at 617. However, the Board's rejection of the sole method claim was upheld on grounds of obviousness over the prior art. *See id.*

Next, the court in *In re Mahony* distinguished *Prater II*.<sup>38</sup> The claims at issue in *Mahony* involved a process for distinguishing data bits from framing bits in a bit stream.<sup>39</sup> The court found that a method claim defining a "bit" and a "bit stream" was not readable on a mentally performable process, even though the claims at issue made no express reference to a machine-implemented process or a nonmental process.<sup>40</sup> Accordingly, the panel found the claims in full statutory compliance with both sections 101 and 112.<sup>41</sup>

## 2. A Temporary End to the "Mental Steps" Doctrine

Following *Mahony*, the *In re Musgrave* court dealt the "mental steps" doctrine, long relied upon by the PTO as the main vehicle to implement its policy of discouraging software applicants, a severe blow.<sup>42</sup> The technology in *Musgrave* involved a method of applying a family of hyperbolic functions to a family of seismograms used in subterranean surveys.<sup>43</sup> The claims at issue defined the steps of generating, detecting and mathematically manipulating seismic signals.<sup>44</sup> The Board rejected the claims on the grounds that the steps relied upon for patentability were mental.<sup>45</sup> The CCPA, in reversing the Board, held that issues of novelty and advancement of an art were irrelevant to the analysis of whether a claimed invention comports with the subject matter requirements of section 101.<sup>46</sup> The opinion went on to state that, in considering the patentability of a process with a plurality of steps, "it is immaterial to the question whether the combination is a statutory 'process' that individual steps are old."<sup>47</sup>

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<sup>38</sup> 421 F.2d 742, 164 U.S.P.Q. (BNA) 572 (C.C.P.A. 1970). Of the pre-*Benson* cases discussed so far, only *Prater II* had an outcome that was unfavorable to the patent applicant. The rationale of *Prater II* was distinguished in subsequent CCPA decisions, as for example, in *In re Mahony* and in *In re Benson*, 441 F.2d 682, 169 U.S.P.Q. (BNA) 548 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972). Moreover, several CCPA decisions applied *Prater II* as supporting the patentability of the subject invention. *See, e.g., In re Bernhart and Fetter*, 417 F.2d 1395, 1400, 163 U.S.P.Q. (BNA) 611, 616 (C.C.P.A. 1969); *In re Foster*, 438 F.2d 1011, 1015, 169 U.S.P.Q. (BNA) 99, 101 (C.C.P.A. 1971).

<sup>39</sup> *See Mahony*, 421 F.2d at 743, 164 U.S.P.Q. (BNA) at 573.

<sup>40</sup> *See id.* at 746, 164 U.S.P.Q. (BNA) at 575-76.

<sup>41</sup> *See id.* at 745, 747, 164 U.S.P.Q. (BNA) at 575-76.

<sup>42</sup> *In re Musgrave*, 431 F.2d 882, 167 U.S.P.Q. (BNA) 280 (C.C.P.A. 1970).

<sup>43</sup> *See id.* at 884, 167 U.S.P.Q. (BNA) at 282-83. A hyperbolic function is a function of an angle expressed as a relationship between the distances from a point on a hyperbola to the origin and to the coordinate axes. An understanding of hyperbolic functions is not necessary to appreciate the point made here.

<sup>44</sup> *See id.* at 885, 167 U.S.P.Q. (BNA) at 283.

<sup>45</sup> *See id.* at 888, 167 U.S.P.Q. (BNA) at 285 ("That which is presented to distinguish these claims over the conventional method of seismic exploration is the broad method of applying correction data to experimental data by every possible procedure, including mere mental processing of the data." (quoting the decision of the PTO Board of Appeals)).

<sup>46</sup> *See id.* at 889, 167 U.S.P.Q. (BNA) at 286.

<sup>47</sup> *Id.* at 893, 167 U.S.P.Q. (BNA) at 289 (emphasis in the original).

The most far-reaching portion of *Musgrave*, however, was the court's rejection of the Board's determination that the claims were non-statutory because some or all of the claimed steps could be carried out with or without the aid of the human mind. Using broad language, the court discarded that notion, stating the only thing necessary to make a sequence of operational steps a statutory process within section 101 "is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of 'useful arts.'"<sup>48</sup> Thus, *Musgrave* not only reiterated points previously laid out in *Prater I*, *Bernhart* and *Mahony*, but went even further, becoming one of the most significant CCPA decisions on the issue of computer-related inventions. The court applied the same reasoning in *In re Foster*, where the CCPA found a method of processing geophysical data statutorily "within the technological arts."<sup>49</sup>

A year after *Musgrave*, the CCPA considered the patentability of a clearly software-based method for converting signals from binary coded decimal numbers to binary numbers in the soon-to-be famous case of *In re Benson*.<sup>50</sup> The *Benson* decision was particularly significant because the claims on appeal were directed solely to the field of data processing.<sup>51</sup> The CCPA rejected the Board's contention that the appended claim to an algorithm was "basically mental" because one of the two claims on appeal explicitly and implicitly required specific hardware (i.e., a shift register)<sup>52</sup> and because the other claim had no practical use other than in the operation of a computer.<sup>53</sup>

The CCPA's *Benson* decision was the high watermark in the line of decisions beginning with *Prater*, showing the court's support for the patentability of software-related inventions and its rejection of PTO policy to the contrary. This line of cases essentially held that, as long as a process had practical application, it was within the technological arts and was therefore statutory subject matter under section 101, presaging the very similar holding in *State Street Bank* more than a quarter of a century later.<sup>54</sup>

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<sup>48</sup> *Musgrave*, 431 F.2d at 893, 167 U.S.P.Q. (BNA) at 289-90 (citing U.S. CONST. art. I, § 8).

<sup>49</sup> *In re Foster*, 438 F.2d 1011, 1015, 169 U.S.P.Q. (BNA) 99, 101 (C.C.P.A. 1971) ("[I]t is not important whether the claims contain mental steps or not if the process is within the technological arts.").

<sup>50</sup> 441 F.2d 682, 683, 169 U.S.P.Q. (BNA) 548, 549 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>51</sup> *See id.* at 686, 169 U.S.P.Q. (BNA) at 551.

<sup>52</sup> *See id.* at 687, 169 U.S.P.Q. (BNA) at 552.

<sup>53</sup> *See id.* at 688, 169 U.S.P.Q. (BNA) at 553.

<sup>54</sup> *See State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1375, 47 U.S.P.Q.2d (BNA) 1596, 1602 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999) ("The 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 rather on the essential characteristics of the subject matter, in particular, its practical utility.").



### B. *The PTO Takes Its Battle to the Supreme Court*

The CCPA decisions from *Prater* to *Benson* were plainly a series of defeats for the PTO. Together, the decisions threatened a steady erosion of the PTO's policy discouraging patent applications for software-related inventions. Faced with this threat, the PTO had only two choices: (1) yield to the CCPA and accept the anticipated flood of software applications, or (2) take the unusual and costly step of appealing to the Supreme Court.<sup>55</sup> The PTO considered the stakes high enough to justify an appeal, and the *Benson* case provided a vehicle for Supreme Court review.<sup>56</sup>

In that case, denominated *Gottschalk v. Benson* in the Supreme Court, the PTO squared off against the CCPA in a confrontation of administrative policy versus legal reasoning that would have long-lasting, world-wide consequences.<sup>57</sup> In essence, the PTO strategy was to use the admitted software invention in *Benson* to make its case that software implemented processes, and the mathematical algorithms at their heart, constituted a new category of technology that fell outside the broad scope of patentable subject matter specified in section 101.<sup>58</sup> To support this "new category" theory, the PTO relied upon the fact that it had neither properly trained examiners nor an adequate body of prior art to examine this new type of subject matter.<sup>59</sup> The President's Commission on the Patent System articulated this position.<sup>60</sup> The Supreme Court quoted this somewhat self-serving document with approval:

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<sup>55</sup> *Benson* marked only the third time since 1950 that the Commissioner of Patents and Trademarks petitioned a case to the Supreme Court. The Supreme Court granted all three petitions, and all three cases were decided in the Commissioner's favor. See *Gottschalk v. Benson*, 409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972); *Brenner v. Hofstetter*, 389 U.S. 5, 155 U.S.P.Q. (BNA) 289 (1967); *Brenner v. Manson*, 383 U.S. 519, 142 U.S.P.Q. (BNA) 35 (1966).

<sup>56</sup> Former Commissioner of Patents and Trademarks, Gerald J. Mossinghoff, commented that there was and has been a longstanding and continuous disagreement between the PTO and the Justice Department Antitrust Division, with the Justice Department Antitrust Division of the time favoring weak intellectual property protection. Because the Justice Department ultimately controls which cases go to the Supreme Court, and because the *Benson* case appeared to be winnable as an anti-patent case, the Justice Department approved taking this case to the Supreme Court. Interview with the Honorable Gerald J. Mossinghoff, former Commissioner of Patents and Trademarks, in Arlington, Va. (Sept. 13, 1999) [hereinafter Mossinghoff interview].

<sup>57</sup> 409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972) (quoting Exec. Order No. 11,215, 30 C.F.R. 4661 (1965), "*To Promote the Progress of . . . the Useful Arts*" In an Age of Exploding Technology, Report of the President's Comm'n on the Patent System, reprinted in S. DOC. NO. 5, 90th Cong., 1st Sess. at 21).

<sup>58</sup> See Brief for Petitioner at 20, *Gottschalk v. Benson*, 409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972) (No. 71-485).

<sup>59</sup> See *id.* at 31-32. "Aside from the problems of enormous volume and the economic and personnel constraints faced by the Patent Office, the difficulties of developing an adequate examination system are inherent in the classification of broad abstract mental processes." *Id.* at 32.

<sup>60</sup> Exec. Order No. 11,215, 30 C.F.R. 4661 (1965), "*To Promote the Progress of . . . the Useful Arts*" In an Age of Exploding Technology, Report of the President's Comm'n on the Patent System, reprinted in S. DOC. NO. 5, 90th Cong., 1st Sess. at 21. This Report suggested that protection of soft-

The Patent Office now cannot examine applications for programs because of a lack of a classification technique and the requisite search files. Even if these were available, reliable searches would not be feasible or economic because of the tremendous volume of prior art being generated. Without this search, the patenting of programs would be tantamount to mere registration and the presumption of validity would be all but nonexistent.

It is noted that the creation of [computer] programs has undergone substantial and satisfactory growth in the absence of patent protection and that copyright protection for programs is presently available.<sup>61</sup>

The thrust of this position was that Congress should amend section 101 to specifically include the new technology.<sup>62</sup> The beauty of this approach was that if Congress amended the law, then the PTO could justifiably request additional funding to carry out the Congressional mandate.<sup>63</sup>

Against this complex PTO position mating patent law with an administrative plea for help, stood the far more straightforward opinion of the CCPA. In essence, the CCPA position was simply that software is a useful technology. Therefore, software methods should be patentable because Congress intended, as expressed in section 101, that the realm of patentable subject matter should encompass all useful technology.<sup>64</sup>

Interestingly, Judge Rich, author of the *State Street Bank* opinion, and the only judge on the Federal Circuit who was active during the entire period of the software battle between the CCPA and the PTO, wrote the CCPA *Benson* opinion. Not surprisingly, Judge Rich's view of the law did not change over time. In his *Benson* opinion, he stated, referring to digital computers, "[c]ash registers, bookkeeping machines, and adding machines also work only with numbers but this has never been considered a ground for taking them out of the 'machine' category of Section 101."<sup>65</sup> Judge Rich considered *Benson* to be "the outgrowth of a blanket Patent Office policy . . . to deny claims such as those before us here on the ground that

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ware by patent was unnecessary because adequate protection was available by copyright. The fallacy of this reasoning is that copyright protects only the expression of a software program, and thus, would fail to protect that functional aspect of the program, providing a much narrower form of protection than a patent affords. For a discussion of the interrelationship of patents, copyrights and trade secrets in the context of software protection, see generally, Gregory J. Maier, *Software Protection—Integrating Patent, Copyright and Trade Secret Law*, 69 J. PAT. [& TRADEMARK OFF.] SOC'Y. 151 (1987).

<sup>61</sup> *Benson*, 409 U.S. at 72, 175 U.S.P.Q. (BNA) at 677.

<sup>62</sup> Brief for Petitioner at 32-33, *Gottschalk v. Benson*, 409 U.S. 63, 175 U.S.P.Q. (BNA) 673 (1972) (No. 71-485).

<sup>63</sup> Commissioner Mossinghoff pointed out that the 1966 report of the President's Commission on the Patent System was largely a battle between AT&T, which strongly supported the patenting of software, and IBM, which bitterly opposed it. IBM's position as a mainframe manufacturer and seller was that software should be unpatentable and should be given away free of charge. AT&T, as primarily a software developer, felt precisely the opposite. Mossinghoff interview, *supra* note 56.

<sup>64</sup> "It seems beyond question that the machines—the computers—are in the technological field, are a part of one of our best-known technologies, and are in the 'useful arts' rather than the 'liberal arts.'" Application of *Benson*, 441 F.2d 682, 688, 169 U.S.P.Q. (BNA) 548, 553 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>65</sup> *Id.* at 687, 169 U.S.P.Q. (BNA) at 552.

they were not for statutory subject matter.”<sup>66</sup> Thus, he knew of the larger interests at stake in the case.

The claims in *Benson* defined a method of converting signals from binary coded decimal form into binary and a data processing method for converting binary coded decimal number representations into binary number representations.<sup>67</sup> The highly mathematical claims were broadly written; therefore it was not surprising that a Supreme Court that rarely held a patent valid in an age of anti-patent sentiment<sup>68</sup> agreed with the PTO in finding the subject claims unpatentable. The Supreme Court apparently accepted the PTO theory that software was a new category of technology outside the scope of section 101, stating that “considered action by the Congress is needed”<sup>69</sup> to clarify the question of software patentability. Yet the Court clearly did not rule that software-related inventions were *per se* unpatentable, specifically stating, “It is said that [our] decision precludes a patent for any program servicing a computer. We do not so hold.”<sup>70</sup> The Court then tried to express its holding in the following “nutshell”:

It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting BCD numerals to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.<sup>71</sup>

The net impact of the decision was confusion. Although the PTO sought a definitive holding that software-related methods were not patentable, the Supreme Court categorically refused to make such a holding. Instead, the Court called for Congressional clarification of the patentability of software-implemented methods, suggesting that the Court felt that software technology was outside the scope of patentable subject matter as defined by section 101. The nutshell holding simply reiterated traditional principles of patent law that abstract ideas, such as mathematical formulas, are not patentable.

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<sup>66</sup> *Id.* at 686, 169 U.S.P.Q. (BNA) at 551.

<sup>67</sup> *Benson*, 409 U.S. at 73-74, 175 U.S.P.Q. (BNA) at 677.

<sup>68</sup> The anti-patent sentiment of the Supreme Court is well documented in the literature. *See, e.g.*, Donald S. Chisum, *The Future of Software Protection: The Patentability of Algorithms*, 47 U. PITT L. REV. 959, 991 (1986) (“[T]he language in the opinions showed a marked hostility toward patent rights on the part of many of the Justices on the [Supreme] Court during [the 1930s and 1940s], most particularly William O. Douglas, author of the *Benson* opinion.”); Samuel A. Oddi, *An Uneasier Case for Copyright Than for Patent Protection of Computer Programs*, 72 NEB. L. REV. 351, 407 (1993) (“In the early 1980’s the [Supreme] Court’s bias against patents in general, which had persisted for over the prior half century, began to erode.”).

<sup>69</sup> *Benson*, 409 U.S. at 73, 175 U.S.P.Q. (BNA) at 677.

<sup>70</sup> *Id.* at 71, 175 U.S.P.Q. (BNA) at 676 (emphasis added).

<sup>71</sup> *Id.* at 71-72. [Editor’s Note: The U.S.P.Q. reporter replaces the words “BCD numerals” with “Binary code.” *See Benson*, 175 U.S.P.Q. (BNA) at 676.]

While the *Benson* Court opinion itself was thus rather innocuous, its reception by the PTO and the patent bar was tumultuous. The PTO declared victory, interpreting the decision as vindication of its anti-software patent policy over the CCPA's pro-software patent position. The patent bar capitulated, generally agreeing to interpret *Benson* as holding that software method claims were no longer patentable. The copyright bar eagerly embraced the position first stated by the 1966 Report of the President's Commission on the Patent System that copyright adequately protected software, particularly now that software was (under the PTO's interpretation) ineligible for patent protection. Policymakers in other countries followed suit, and the anti-software patent position the PTO espoused essentially became the official world position,<sup>72</sup> even though the *Benson* decision, as the basis for this policy, was ambiguous.

## II. POST-BENSON, THE FREEMAN-WALTER-ABELE AGE

*Benson* left many issues unresolved, to say the least. While it seemed to definitely hold that claims preempting algorithms were not patentable under section 101, it did not define either "preempting" or "algorithm." The Court left to the CCPA the task of fabricating a workable test to define these concepts, now crucial to deciding the patentability of claims to software-related inventions.

### A. *The Federal Circuit Responds to Benson in In re Freeman*

*In re Freeman* was the first case in which the CCPA attempted to craft the new test for software patentability.<sup>73</sup> The *Freeman* claim involved a system for typesetting alphanumeric information, using a computer-based control system in conjunction with a phototypesetter of conventional design.<sup>74</sup> In *Freeman* the CCPA addressed the confusion over interpretation of the word "algorithm." The *Benson* court had defined an algorithm as "a procedure for solving a given type of mathematical problem."<sup>75</sup> In *Freeman*, the CCPA rejected a broad definition of an algorithm as a step-by-step procedure for solving a problem or accomplishing some end.<sup>76</sup> The CCPA found this definition overly broad, stating that it "leads to the ab-

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<sup>72</sup> Commissioner Mossinghoff agreed with this position and noted that the European Patent Office and Japanese Patent Office guidelines, to this day, prohibit the patentability of business methods. Mossinghoff interview, *supra* note 56. The authors note that the European Patent Office and the Japanese Patent Office have traditionally looked to the United States Patent and Trademark Office for leadership in cutting edge issues. We would not be surprised if the European Patent Office and the Japanese Patent Office approve of business method patents in the near future.

<sup>73</sup> 573 F.2d 1237, 197 U.S.P.Q. (BNA) 464 (C.C.P.A. 1978).

<sup>74</sup> *See id.* at 1238, 197 U.S.P.Q. (BNA) at 465.

<sup>75</sup> *Benson*, 409 U.S. at 65, 175 U.S.P.Q. (BNA) at 674.

<sup>76</sup> *See Freeman*, 573 F.2d at 1245-46, 197 U.S.P.Q. (BNA) at 470-71.

surd view that [in *Benson*] the Court was reading the word 'process' out of [35 U.S.C. § 101]."<sup>77</sup>

In *Freeman*, the CCPA interpreted *Benson* as concerned only with mathematical algorithms.<sup>78</sup> The CCPA went on to interpret *Benson* as requiring a two-part test:

First, it must be determined whether the claim directly or indirectly recites an 'algorithm' in the *Benson* sense of that term, for a claim which fails even to recite an algorithm clearly cannot wholly preempt an algorithm. Second, the claim must be further analyzed to ascertain whether in its entirety it wholly preempts that algorithm.<sup>79</sup>

Applying the first part of the new test, the CCPA found that neither the apparatus claims nor the method claims recited or preempted a mathematical algorithm.<sup>80</sup> Consequently, the CCPA reversed the Board without considering the second part of its new test.

#### B. *The PTO Seeks a Second Review by the Supreme Court*

In 1978, six years after *Benson* and a few months after *Freeman*, the PTO was back before the Supreme Court in *Parker v. Flook*,<sup>81</sup> taking yet another rare appeal from the CCPA in a further effort to discourage patent applications for software-related inventions.<sup>82</sup>

The invention in *Flook* involved a method for updating alarm limits during catalytic conversion processes.<sup>83</sup> When any of the process variables exceeded a predetermined "alarm limit," an alarm signaled the presence of an abnormal condition.<sup>84</sup> In essence, the claimed method consisted of the following three steps: (1) measuring the present value of the process variable (i.e., temperature); (2) using an algorithm to calculate an updated alarm limit value; and (3) adjusting the actual alarm limit to the updated value.<sup>85</sup>

*Flook* brought to a head the conflict between the PTO and CCPA over the interpretation of *Benson*. The claim in *Flook* was clearly a mathematical algorithm, but it included the further step of using the solution of the claimed algorithm to update a process alarm limit. This "post solution" activity exposed an easily exploitable loophole in the *Benson* holding, posing a serious threat to the PTO anti-software patent policy. If applicants

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<sup>77</sup> See *id.* at 1246, 197 U.S.P.Q. (BNA) at 471.

<sup>78</sup> See *id.* at 1245, 197 U.S.P.Q. (BNA) at 470.

<sup>79</sup> See *id.* at 1245, 197 U.S.P.Q. (BNA) at 471.

<sup>80</sup> See *id.* at 1247, 197 U.S.P.Q. (BNA) at 472.

<sup>81</sup> 437 U.S. 584, 198 U.S.P.Q. (BNA) 193 (1978).

<sup>82</sup> Justice Department policy and support for the PTO was essentially unchanged from the *Benson* period. The same was true of the enforcement climate.

<sup>83</sup> See *Flook*, 437 U.S. at 585, 198 U.S.P.Q. (BNA) at 195.

<sup>84</sup> See *id.*, 198 U.S.P.Q. (BNA) at 195.

<sup>85</sup> See *id.*, 198 U.S.P.Q. (BNA) at 195.

could avoid the *Benson* prohibition against patenting mathematical algorithms simply by adding a physical step, a minimal post solution activity, then the impact of *Benson* would be minimized and PTO policy all but emasculated. This risk warranted the highly unusual<sup>86</sup> expense and effort of returning to the Supreme Court for further consideration of essentially the same issue raised in *Benson*—patentability of software-related methods under section 101.

The *Flook* appeal to the Supreme Court was *Benson* *deja vu*. The PTO again relied on an imagined administrative crisis to justify its theory that the claims in *Flook* should be considered unpatentable under *Benson*. The Supreme Court again found the subject claims unpatentable, as the PTO urged, but the opinion employed some rather twisted logic. Although it paid lip service to the concept that patent claims must be construed as a whole, the Court blatantly dissected the subject claim while simultaneously mixing section 102 prior art concepts with section 101 issues. “Respondent’s process is unpatentable under section 101, not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention.”<sup>87</sup> Yet, the Court also specifically stated that “a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm.”<sup>88</sup> Despite the twisted logic, the PTO position on patentability was again upheld, providing another technical victory for the PTO, but still no truly definitive holding that would put an end to the software method conflict with the CCPA.

### C. *The CCPA Modifies the Freeman Test in In re Walter*

After *Flook*, the CCPA’s decision in *In re Walter* modified the *Freeman* test to be consistent with the Supreme Court’s holding in *Flook*.<sup>89</sup> *Walter* dealt with a seismic prospecting and surveying system.<sup>90</sup> Appealing the Board’s rejection, *Walter* contended that his claims were not directed to a mathematical procedure. Rather, the claims were directed to a method that produced a physical result, by processing physical signals described in mathematical terms and to an apparatus for implementing the unique process.<sup>91</sup> *Walter* also asserted that the PTO defied the proposition that claims are to be considered as a whole when it dissected the claims. Instead, the

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<sup>86</sup> See *supra* note 55.

<sup>87</sup> *Flook*, 437 U.S. at 594, 198 U.S.P.Q. (BNA) at 199.

<sup>88</sup> *Id.* at 590, 198 U.S.P.Q. (BNA) at 197.

<sup>89</sup> *In re Walter*, 618 F.2d 758, 205 U.S.P.Q. (BNA) 397 (C.C.P.A. 1980).

<sup>90</sup> See *id.* at 760, 205 U.S.P.Q. (BNA) at 401.

<sup>91</sup> See *id.* at 763, 205 U.S.P.Q. (BNA) at 403.

PTO ignored their physical aspects when it classified them as mathematical or algorithmic in character.<sup>92</sup>

The CCPA used this case to reformulate the second part of the *Freeman* test as follows: "If it appears that the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims), the claim being otherwise statutory, the claim passes muster under section 101."<sup>93</sup> Additionally, the CCPA indicated that, if the end product of a claimed process is a pure number, then the claimed invention does not contain statutory subject matter, regardless of any post solution activity.<sup>94</sup> On the other hand, if the claimed invention produces a physical result, the fact that the result is represented in numerical form does not render the claim nonstatutory.<sup>95</sup>

#### D. *The PTO Seeks a Third Review by the Supreme Court*

In 1981, the PTO returned to the Supreme Court yet again in *Diamond v. Diehr*.<sup>96</sup> This time, however, a new era had begun with the election of Ronald Reagan as President of the United States. The Reagan Administration ended the era of antitrust ascendancy and recognized that innovation itself was one of the most important American "products."<sup>97</sup> Thus, a strong patent system was an important component of Reagan's policy. To strengthen the patent system and provide national uniformity in patent law, the Reagan Administration quickly began the work of establishing the Court of Appeals for the Federal Circuit as a prestigious national court of appeals for all patent matters.<sup>98</sup>

Further, in the term preceding *Diehr*, the Supreme Court acknowledged the broad scope of section 101 in the landmark case of *Diamond v. Chakrabarty*.<sup>99</sup> Specifically, the Court looked to the committee reports accompanying the 1952 Patent Act, which include the now famous words: "Congress intended statutory subject matter to include anything under the sun that is made by man."<sup>100</sup> In light of this premise, the Court found a

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<sup>92</sup> See *id.*, 205 U.S.P.Q. (BNA) at 403.

<sup>93</sup> See *id.* at 767, 205 U.S.P.Q. (BNA) at 407.

<sup>94</sup> See *id.* at 767-68, 205 U.S.P.Q. (BNA) at 407.

<sup>95</sup> See *id.* at 768, 205 U.S.P.Q. (BNA) at 407.

<sup>96</sup> 450 U.S. 175, 209 U.S.P.Q. (BNA) 1 (1981).

<sup>97</sup> See Lawrence G. Kastriner, *The Revival of Confidence in the Patent System*, January 1991 J. OF THE PAT. & TRADEMARK OFFICE SOC. 5-8. For a brief synopsis of the factors leading up to the creation of the CAFC, see The Hon. Gerald J. Mossinghoff's, *Side Bar: The Creation of the Federal Circuit*, in PRINCIPLES OF PATENT LAW 29-30 (Donald S. Chisum et al., 1998).

<sup>98</sup> "The [Federal Circuit] has not only succeeded in bringing about uniformity and certainty in interpretation of the patent laws—the express purpose for which it was established—but has also significantly enhanced the economic power of patents." See Kastriner, *supra* note 97 at 8.

<sup>99</sup> 447 U.S. 303, 206 U.S.P.Q. (BNA) 193 (1980).

<sup>100</sup> *Id.* at 309, 206 U.S.P.Q. (BNA) at 197 (quoting S. REP. NO. 1979, 82d Cong., 2d Sess., 5

live, man-made microorganism patentable subject matter under section 101.<sup>101</sup>

The Supreme Court in *Diehr* absorbed the spirit of change in the national sentiment toward innovation.<sup>102</sup> In contrast to *Flook* and *Benson*, both of which were reluctant to extend patent rights into areas “wholly unforeseen by Congress”<sup>103</sup> (i.e., software patents), the *Diehr* Court noted that the 1952 Patent Act included as statutory subject matter “anything under the sun that is made by man.”<sup>104</sup> Rather than voicing concern about extending patent law to cover software methods, the *Diehr* Court reiterated the warning in *Chakrabarty* that “courts ‘should not read into the patent laws limitations and conditions which the legislature has not expressed.’”<sup>105</sup> The *Diehr* Court exhibited a new attitude toward the patentability of software method claims relative to the *Benson* and *Flook* Courts. It saw computerized methods as naturally within the nearly unlimited scope of potentially patentable subject matter, rather than as a “new category” of subject matter requiring an amendment of the law.<sup>106</sup> The *Diehr* Court went on to specifically limit *Benson* and *Flook* to standing for nothing more than the long-established principle that laws of nature, natural phenomena and abstract ideas are excluded from patent protection.<sup>107</sup>

In *Diehr*, the Supreme Court upheld the eligibility for patent protection of claims drawn to a process for curing synthetic rubber.<sup>108</sup> Rather than focusing solely on the claimed algorithm, the Court focused on whether the mathematical algorithm was claimed in the “abstract” or was “applied” to the claimed invention, viewed as a whole.<sup>109</sup> The *Diehr* Court rejected the “point of novelty”<sup>110</sup> approach essential to the claim dissection

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(1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess., 6 (1952)).

<sup>101</sup> See *id.* at 310, 206 U.S.P.Q. (BNA) at 197.

<sup>102</sup> The composition of the court did not change between the *Flook* and *Diehr* decisions; however, Justices White and Powell, who sided with the majority in both cases, appeared to change their stance on the patentability of algorithms.

<sup>103</sup> *Parker v. Flook*, 437 U.S. 584, 596, 198 U.S.P.Q. (BNA) 193, 200 (1981).

<sup>104</sup> *Diehr*, 450 U.S. at 182, 209 U.S.P.Q. (BNA) at 6 (quoting S. REP. NO. 1979, 82d Cong., 2d Sess., 5 (1952)); H.R. REP. NO. 1923, 82d Cong., 2d Sess., 5 (1952).

<sup>105</sup> *Diehr*, 450 U.S. at 182, 209 U.S.P.Q. (BNA) at 6 (quoting *Diamond v. Chakrabarty* 447 U.S. 303, 308, 206 U.S.P.Q. (BNA) 193, 196 (quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199, 17 U.S.P.Q. (BNA) 154,162 (1933))).

<sup>106</sup> See *id.* at 185, 209 U.S.P.Q. (BNA) at 7. (“Our conclusion regarding respondent’s claims is not altered by the fact that in several steps of the process a mathematical equation and a programmed digital computer are used.”).

<sup>107</sup> See *id.* at 185-86, 209 U.S.P.Q. (BNA) at 7-8.

<sup>108</sup> See *id.* at 184, 209 U.S.P.Q. (BNA) at 10.

<sup>109</sup> *Id.* at 188, 209 U.S.P.Q. (BNA) at 9.

<sup>110</sup> The point of novelty approach dissects each claim into old and new elements. If none of the new elements is directed to statutory subject matter, then the entire claim is deemed nonstatutory. Under this approach, it is difficult, if not impossible, to obtain patent protection for a new algorithm used in combination with an old process. The *Diehr* Court held to the principle that patent claims must be considered as a whole. The *Benson* and *Flook* Courts did not rely on this principle. Instead they



used in *Benson* and *Flook*, stating, “[C]laims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis.”<sup>111</sup>

*Diehr*'s impact, aside from making a number of important technical clarifications in the law, returned control over the law of software method patentability to the CCPA. The PTO would not take the issue to the Supreme Court again, leaving the door open for expanded patent protection for software-based inventions. Yet in many ways the anticipated influx of software-related applications was no longer a problem for the PTO. The new pro-innovation, pro-patent bias of the Reagan Administration suggested that the PTO could now budget for and receive the increased resources it needed to properly handle the increased software workload. In addition, a contemporaneous overhaul of the PTO fee structure enabled the PTO to become fully self-funding, regardless of its workload. Further, the development of the software industry created an adequate population of skilled software engineers from which the PTO could recruit properly skilled examiners.

Viewed in this perspective, the PTO's efforts to discourage and retard the projected deluge of software-related application filings can be considered successful. Its victories in *Benson* and *Flook* may have delayed increased software application filings just long enough to allow the national sentiment to shift in a manner favorable to the patent system. This shift enabled the PTO to obtain adequate resources so that it could perform its obligations to examine thoroughly all applications and issue valid patents.

#### E. *The CCPA Modifies its Test Yet Again After Diehr*

After *Diehr*, the CCPA refined and finalized the *Freeman-Walter* software patentability test in the case of *In re Abele*.<sup>112</sup> The CCPA's new test specified that “[I]f the claim would be ‘otherwise statutory,’ albeit inoperative or less useful without the algorithm, the claim likewise presents statutory subject matter when the algorithm is included.”<sup>113</sup> With the *Abele* decision, the CCPA completed its cumbersome *Freeman-Walter-Abele* test for patentability of software-related claims that remained in use until finally discarded in *In re Alappat*.<sup>114</sup> The test was rather awkward

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dissected claims by disregarding mathematical aspects, then sought a point of novelty on which to base their decision on patentability.

<sup>111</sup> *Id.*

<sup>112</sup> 684 F.2d 902, 214 U.S.P.Q. (BNA) 682 (C.C.P.A. 1982).

<sup>113</sup> *Id.* at 907, 214 U.S.P.Q. (BNA) at 686 (C.C.P.A. 1982) (citing *In re Walter*, 618 F.2d 758, 769, 205 U.S.P.Q. (BNA) 397, 409 (C.C.P.A. 1980)).

<sup>114</sup> 33 F.3d 1526, 1543, 31 U.S.P.Q.2d (BNA) 1545, 1557 (Fed. Cir. 1994) (explaining how the *Freeman-Walter-Abele* test could be misleading). The Federal Circuit's sentiment toward the *Freeman-Walter-Abele* test was even more strongly pronounced in *State Street Bank*, which stated, “the *Freeman-Walter-Abele* test has little, if any, applicability to determining the presence of statutory

because it required dissecting claims in software-related cases into algorithmic and non-algorithmic components for analysis,<sup>115</sup> a process clearly at odds with the basic principle that claims should stand or fall as a whole.<sup>116</sup> Furthermore, the test required the analyzing party to determine whether some or all of the language of a claim constituted a mathematical algorithm.<sup>117</sup> This analysis was often very difficult, as was determining whether a mathematical algorithm, when identified, is entirely preempted by the claim. This convoluted and arcane test, including aspects of the holdings of *Benson*, *Flook* and *Diehr*, was really somewhat of an anachronism motivated entirely by the PTO's efforts to classify software-related method claims as a "new category" of subject matter requiring special analysis. Over the three decades since the PTO conceived this concept, software metamorphosed from a black art to one of the most common commodities in use today. The understanding that software need no longer be considered a mysterious "new category" of subject matter requiring special analysis, but should really be considered and treated no different from other technologies, is one of the important thrusts of *State Street Bank*.

### III. THE FEDERAL CIRCUIT ERA

The Federal Circuit first addressed the patentability of software-related inventions in 1989, issuing two opinions within days of one another: *In re Grams*<sup>118</sup> and *In re Iwahashi*.<sup>119</sup> These opinions, decided by different panels, reached nearly opposite results, suggesting a division on the issue within the Federal Circuit. In *Grams*, the court upheld the Board's rejection of claims to clinical data analysis software as being directed to a non-statutory mathematical algorithm.<sup>120</sup> However, in *Iwahashi*, the court reversed a Board rejection, finding claims directed to a voice recognition coefficient calculation apparatus statutory.<sup>121</sup> The disparate holdings in these decisions raised questions as to whether or not the new Federal Circuit would follow the lead of the old CCPA in this controversial area of law.

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subject matter." *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1374, 47 U.S.P.Q.2d (BNA) 1596, 1601 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

<sup>115</sup> See *Abele*, 684 F.2d at 907, 214 U.S.P.Q. (BNA) at 686.

<sup>116</sup> See *Diehr*, 450 U.S. at 188, 209 U.S.P.Q. (BNA) at 9.

<sup>117</sup> See *Abele*, 684 F.2d at 905, 214 U.S.P.Q. (BNA) at 685 (citing *In re Freeman*, 573 F.2d 1237, 1245, 197 U.S.P.Q. (BNA) 464, 471 (C.C.P.A. 1978)).

<sup>118</sup> 888 F.2d 835, 12 U.S.P.Q.2d (BNA) 1824 (Fed. Cir. 1989).

<sup>119</sup> 888 F.2d 1370, 12 U.S.P.Q.2d (BNA) 1908 (Fed. Cir. 1989).

<sup>120</sup> See *Grams*, 888 F.2d at 840-41, 214 U.S.P.Q.2d (BNA) at 1828.

<sup>121</sup> See *Iwahashi*, 888 F.2d at 1371, 1375, 12 U.S.P.Q.2d (BNA) at 1909, 1911.

A. *The Federal Circuit Follows the Footsteps of the CCPA in Arrhythmia*

After this apparent conflict between two of its panels, the Federal Circuit decided *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, an infringement case that relied on a non-statutory subject matter defense.<sup>122</sup> In *Arrhythmia*, the claimed invention was directed to a method and apparatus for analyzing electrocardiographic signals generated by the human heart.<sup>123</sup> Immediately after a heart attack, the victim is particularly vulnerable to an acute type of heart arrhythmia known as ventricular tachycardia. This condition leads to ventricular fibrillation that normally results in death. If the condition is properly and quickly diagnosed, it can be treated easily, saving the victim's life.<sup>124</sup> The invention consisted essentially of a digital computer programmed to analyze the output of an electrocardiograph using novel software to provide an output indicating whether or not tachycardia existed and required treatment.<sup>125</sup>

In analyzing the section 101 issue in *Arrhythmia*, the court first pointed out that a programmed digital computer helped perform the steps in the claimed method.<sup>126</sup> Second, the court recognized that mathematical formulas, essential to the computer software, comprised a large part of the invention.<sup>127</sup> Although the alleged infringer argued that the claimed invention was non-statutory, nothing more than an algorithm producing an abstract output number based on calculations performed on an input number,<sup>128</sup> the court disagreed. The court found both the process and the apparatus claims were drawn to statutory subject matter.<sup>129</sup> Concluding that the output of the invention was not a mathematical abstraction, but a measure in microvolts of a specified heart activity,<sup>130</sup> the court held, "that [whether] the product is numerical is not a criterion of whether the claim is directed to statutory subject matter."<sup>131</sup> Thus, the deciding panel seemed to follow *Iwashashi* and reject *Grams*, consistent with the tradition of patentability the old CCPA established.

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<sup>122</sup> 958 F.2d 1053, 22 U.S.P.Q.2d (BNA) 1033 (Fed. Cir. 1992).

<sup>123</sup> *See id.* at 1054, 22 U.S.P.Q.2d (BNA) at 1034.

<sup>124</sup> *See id.* at 1059, 22 U.S.P.Q. 2d (BNA) at 1039.

<sup>125</sup> *See id.* at 1054-55, 22 U.S.P.Q.2d (BNA) at 1034-35.

<sup>126</sup> *See id.* at 1058, 22 U.S.P.Q.2d (BNA) at 1037.

<sup>127</sup> *See id.* at 1058-59, 22 U.S.P.Q.2d (BNA) at 1037-38.

<sup>128</sup> *See id.* at 1058, 22 U.S.P.Q.2d (BNA) at 1037.

<sup>129</sup> *See id.* at 1060-61, 22 U.S.P.Q.2d (BNA) at 1038-39.

<sup>130</sup> *See id.* at 1060, 22 U.S.P.Q.2d (BNA) at 1039.

<sup>131</sup> *Id.*, 22 U.S.P.Q.2d (BNA) at 1039.

B. *PTO Resistance to Software-Related Inventions Causes the Federal Circuit to Broaden the Scope of Software Patentability*

Despite *Diehr's* impact and the Reagan Administration's pro-innovation stance, the PTO retained a strong institutional bias against unrestricted patenting of software-related inventions. Although advances had occurred that no doubt diminished the administrative obstacles to examining software-related inventions first articulated in the Report of the President's Commission on the Patent System, such obstacles had not been eliminated completely. Consequently, the PTO continued to reject claims to software-related inventions and the Board continued to affirm those rejections. Two years after *Arrhythmia*, the Federal Circuit rendered two opinions of extraordinary significance that finally forced the PTO to completely rethink its long-standing opposition to software-related invention patents. The Federal Circuit decided the first of these cases, *In re Alappat, en banc*.<sup>132</sup> *Alappat* resulted from a final flare-up in the thirty-year dispute between the PTO and the patent court over software patentability. In a rather bizarre set of circumstances, the Board initially found the *Alappat* invention patentable; but the Commissioner of Patents forced the Board to rehear the case, and ultimately reverse itself.<sup>133</sup> The Federal Circuit, considering the case, conducted a thorough review of all relevant law on the subject. In the course of this review, the court all but concluded that it should discard the *Freeman-Walter-Abele* test for examining software-related inventions, notwithstanding the PTO's reliance on the test for essentially two decades.<sup>134</sup> The new test the Federal Circuit proposed was simply to consider the claimed invention as a whole and determine whether the claimed invention covered a useful application of technology, or whether it was directed to a disembodied mathematical concept, law of nature or abstract idea.<sup>135</sup> In a nutshell, the Federal Circuit chose to treat

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<sup>132</sup> *In re Alappat*, 33 F.3d 1526, 31 U.S.P.Q.2d (BNA) 1545 (Fed. Cir. 1994).

<sup>133</sup> *See id.* at 1531, 31 U.S.P.Q.2d (BNA) at 1546-47. The Commissioner was Mr. Harry Manbeck. He added four additional members, including himself, to the original Board panel for rehearing the *Alappat* appeal to ensure a vote against patentability on rehearing. At this stage in the lengthy dispute with the Federal Circuit, at least some Board members appeared to disagree with the PTO leadership on the issue of software patentability.

<sup>134</sup> "[B]ecause the dispositive inquiry is whether the claim as a whole is directed to statutory subject matter, it is irrelevant that a claim may contain, as part of the whole, subject matter which would not be patentable by itself." *Id.* at 1544, 31 U.S.P.Q.2d (BNA) at 1557. "We note, however, that an analysis wherein one attempts to identify whether any part of a claim recites mathematical subject matter which would not by itself be patentable is not an improper analysis. Such a dissection of a claim may be helpful under some circumstances to more fully understand the claimed subject matter." *Id.* n.21. As previously mentioned, the *Freeman-Walter-Abele* test was based on dissecting patent claims to determine whether a particular claim recited and fully preempted a mathematical algorithm, and consequently was both difficult to apply in practice, and at odds with the principle that claimed inventions should be treated as a whole.

<sup>135</sup> *See id.* at 1543 n.21, 31 U.S.P.Q.2d (BNA) at 1557 n.21.

the software-related claims in *Alappat* essentially as any other patent claims, rather than as a special category of claims requiring special analysis.

The court continued to chip away at the PTO's position on software-related inventions. About one month after *Alappat*, the Federal Circuit again considered a software-related invention in the case of *In re Warmerdam*.<sup>136</sup> The invention at issue in the case pertained to collision avoidance for robotic machines and was claimed in method, machine and data structure format.<sup>137</sup> Although the Federal Circuit found the method and data structure claims unpatentable, it found the machine claim, which incorporated the method claims, to contain patentable subject matter.<sup>138</sup> The apparatus claim merely specified a memory that contained data representing the output of a programmed computer.<sup>139</sup> Thus, the court recognized as patentable subject matter a claim defining a memory rendered unique by the computer-generated data stored within it.

### C. *Printed Matter Poses Another Hurdle for Software-Related Inventions*

As important as they were to determine the patentability of software inventions, the *Alappat* and *Warmerdam* decisions did not resolve the long-standing question as to whether software products themselves could be claimed independently of a general purpose computer. For decades, as a corollary to its battle against claims to software-related inventions, the PTO had successfully fought the direct patenting of software as an independent product. PTO dogma was that software stored on a disk or in memory could not be patented independently, even though such software products were rapidly becoming very important and useful articles of commerce.

The legal theory the PTO adopted to enforce its policy against patenting software products per se involved case law pertaining to "printed matter."<sup>140</sup> The idea was that, just as the PTO could ignore printed words in assessing the patentability of mechanical inventions, so too could the PTO ignore computer-readable information, recorded by whatever method, on computer-readable media when examining software-related inventions.<sup>141</sup> Although this rationale was appropriate when considering con-

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<sup>136</sup> 33 F.3d 1354, 31 U.S.P.Q.2d (BNA) 1754 (Fed. Cir. 1994).

<sup>137</sup> See *id.* at 1355, 31 U.S.P.Q.2d (BNA) at 1755.

<sup>138</sup> See *id.* at 1358, 1360, 31 U.S.P.Q.2d (BNA) at 1757, 1759.

<sup>139</sup> See *id.* at 1358, 31 U.S.P.Q.2d (BNA) at 1757. Claim 5 reads as follows: "5. A machine having a memory which contains data representing a bubble hierarchy generated by the method of any of Claims 1 through 4."

<sup>140</sup> See, e.g., *In re Gulack*, 703 F.2d 1381, 217 U.S.P.Q. (BNA) 401 (Fed. Cir. 1983).

<sup>141</sup> "Where the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from the prior art in terms of patentability. Although the printed matter must be considered, in that situation it may not be entitled to patentable weight." *Id.* at 1385, 217

ventional printed matter,<sup>142</sup> extending the same rationale to computer-readable media disregarded the fact that electronically recorded, computer-readable, software is not merely information, but includes coded instructions that have the functional capability of reconfiguring a general purpose computer to a special purpose device capable of performing a useful process. Because the computer-readable software can reconfigure a general purpose computer, it is mechanically more analogous to a cam in a machine than to symbols printed on paper.<sup>143</sup>

On the software-as-printed-matter issue, the Federal Circuit's *In re Lowry* decision was a milestone.<sup>144</sup> It held, consistent with its earlier decision in *Warmerdam*, that a particular data structure, as it exists in a computer memory, is entitled to patentable weight because storage of the data imparts physical change to the memory.<sup>145</sup>

The *Lowry* decision distinguished at least one form of electronically-recorded computer-readable information (i.e., data structures) from printed matter, but it did not specifically address the "printed matter" issue as it related to other forms of computer-readable information, namely, software. The PTO's "printed matter" rejection policy was a serious concern to companies like IBM that sold both hardware and software products. As long as "printed matter" rejections prevented issuance of claims to software products per se, software products could only be protected using contributory infringement theories.<sup>146</sup> Contributory infringement can only occur if there is also direct infringement,<sup>147</sup> so this approach did not work well for hardware/software companies like IBM, because the direct infringer could often be one of their hardware customers. To find a software supplier liable as a contributory infringer, for example, IBM might have to first find one of its hardware customers using the software liable as a direct infringer—not an attractive option from the business point of view. Dual producers needed a claim structure that would make an infringing software

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U.S.P.Q. (BNA) at 404.

<sup>142</sup> By conventional printed matter, we mean matter other than software. Such matter has no functional capability and no capability for reconfiguring a general purpose computer. Having no functionality, such matter has no patentable aspects under section 101.

<sup>143</sup> Some would say that symbols printed on paper can reconfigure a machine through the use of optical character recognition (OCR) equipment. The authors do not disagree with this point of view, although we are not aware of any legal support for it.

<sup>144</sup> *In re Lowry*, 32 F.3d 1579, 32 U.S.P.Q.2d (BNA) 1031 (Fed. Cir. 1994).

<sup>145</sup> See *Lowry*, 32 F.3d at 1583, 32 U.S.P.Q.2d (BNA) at 1034.

<sup>146</sup>

"Whoever sells a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. §271(c)(1994).

<sup>147</sup> See *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 341-42, 128 U.S.P.Q. (BNA) 354, 357 (1961).

supplier a direct infringer rather than only the user of the software. Thus was born the computer program product claim, directly readable on software per se. This type of claim directly claims software, but the software must be recorded on a computer readable medium. This the claim format, pioneered by IBM, became a principal target of the PTO's "printed matter" rejections.

#### D. *The Death of the PTO's Opposition to Software-Related Patents*

After *Lowry*, IBM tested its computer program product claim format at the Federal Circuit in *In re Beauregard*.<sup>148</sup> In this unusual case, the PTO took an approach precisely opposite to that taken in *Benson*, *Flook* and *Diehr*. Rather than forcing a confrontation with the Federal Circuit in the Supreme Court, the PTO moved to dismiss the appeal, arguing that remand to the Board was the appropriate disposition of the case.<sup>149</sup> The PTO, under Commissioner Bruce Lehman, was prepared to accept the holding in *Lowry* and give up its battle over software patents. The Appellant (in effect, IBM) agreed, but requested that the court issue the remand order with some sort of precedential effect.<sup>150</sup> While precedential effect may not be possible in such an order, the Federal Circuit tried to comply with this request by issuing the following opinion of just one paragraph in length, but of critical importance to the software industry:

Briefly, on August 4, 1994, the Board rejected *Beauregard's* computer program product claims on the basis of the printed matter doctrine. *Beauregard* appealed. The Commissioner now states "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." The Commissioner states that he agrees with *Beauregard's* position on appeal that the printed matter doctrine is not applicable. Thus the parties are in agreement that no case or controversy presently exists.<sup>151</sup>

The practical impact of *Alappat* and *Beauregard* compelled the PTO's complete repudiation of its long-standing policy of refusing patent protection for software inventions. The PTO had to change the entire examination process for software applications to make it consistent with this new case law. Essentially, for software inventions to be patentable they simply had to be useful, unobvious and fall within one of the four basic categories of patentable subject matter established by section 101 of the statute, namely process, machine, article of manufacture or composition of

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<sup>148</sup> 53 F.3d 1583, 35 U.S.P.Q.2d (BNA) 1383 (Fed. Cir. 1995). This case is not cited in the new PTO Examination Guidelines because the case was withdrawn by the PTO in view of the *Lowry* opinion before the Federal Circuit had an opportunity to render a full opinion on the issues. The PTO evidently considers *Lowry* to be the controlling law on this issue.

<sup>149</sup> See *id.* at 1583-84, 35 U.S.P.Q.2d (BNA) at 1384.

<sup>150</sup> See *id.* at 1584, 35 U.S.P.Q.2d (BNA) at 1384.

<sup>151</sup> *Id.*, 35 U.S.P.Q. 2d (BNA) at 1384.

matter.<sup>152</sup> Abstract ideas, laws of nature or natural phenomenon, of course, remained unpatentable.

An interesting insight into the post-*Alappat* tension within the Federal Circuit is revealed by the *In re Trovato* situation.<sup>153</sup> In the first *Trovato* opinion, decided in December of 1994, a Federal Circuit panel upheld a Board decision rejecting claims in both method and apparatus format to an invention based on a systematic technique of calculating a number representing the shortest path between two points.<sup>154</sup> The Board decision was based on a classic *Freeman-Walter-Abele* analysis of the claims.<sup>155</sup> The *Trovato* opinion, which gave brief lip service to the recent *Alappat* decision,<sup>156</sup> seemed anachronistic in view of *Alappat* and the new proposed PTO guidelines<sup>157</sup> for examining computer-implemented inventions.

The appellants, enraged by the decision, petitioned for both rehearing and rehearing *en banc*. In an action that was both highly unusual and very decisive, the Federal Circuit granted a rehearing *en banc*, and issued a terse but forceful per curiam order.<sup>158</sup> The Court vacated the December 1994 *Trovato* judgment and withdrew the accompanying opinion.<sup>159</sup> It also vacated the Board's decisions and remanded the case for reconsideration in light of *Alappat* and "any new guidelines" the PTO adopted for examining computer-implemented inventions.<sup>160</sup> The message delivered to all members of the Federal Circuit bench and to the PTO could not have been more clear. The Federal Circuit would not affirm PTO rejections of computer-implemented inventions unless consistent with *Alappat* and the proposed new examination guidelines.<sup>161</sup>

Consistent with its enlightened view of software patentability and the strong support of the Federal Circuit, the PTO issued its proposed Guidelines for Computer-Related Inventions in 1995.<sup>162</sup> The guidelines' purpose

<sup>152</sup> See 35 U.S.C. § 101 (1994).

<sup>153</sup> *In re Trovato* 42 F.3d 1376, 33 U.S.P.Q.2d (BNA) 1194 (Fed. Cir. 1994), *vacated and remanded*, 60 F.3d 807, 35 U.S.P.Q.2d (BNA) 1570 (Fed. Cir. 1995).

<sup>154</sup> See *id.* at 1376-77, 33 U.S.P.Q.2d (BNA) at 1194.

<sup>155</sup> See *id.* at 1378, 33 U.S.P.Q.2d (BNA) at 1196.

<sup>156</sup> See *id.* at 1383, 33 U.S.P.Q.2d (BNA) at 1200.

<sup>157</sup> The newly proposed guidelines directed patent examiners to apply all of the requirements of Title 35 when examining applications claiming computer software. See *In re Trovato*, 60 F.3d 807, 35 U.S.P.Q.2d (BNA) 1570, 1571 (Fed. Cir. 1995) *vacating* 42 F.3d 1376, 33 U.S.P.Q.2d (BNA) 1194 (Fed. Cir. 1994) (citing Request for Comments on Proposed Examination Guidelines for Computer-Implemented Inventions, 60 FED. REG. 28,778 (Department of Commerce, Patent and Trademark Office, June 2, 1995.)) The patent examiner rejected *Trovato*'s claims solely on the basis of 35 U.S.C. § 101 without considering whether the claims met the requirements of 35 U.S.C. §§ 102, 103 and 112. See *Trovato*, 42 F.3d at 1376, 33 U.S.P.Q.2d (BNA) at 1194.

<sup>158</sup> See *Trovato*, 60 F.3d at 807, 35 U.S.P.Q.2d (BNA) at 1571.

<sup>159</sup> See *id.* at 807, 35 U.S.P.Q.2d (BNA) at 1571.

<sup>160</sup> *Id.*, 35 U.S.P.Q. 2d (BNA) at 1571.

<sup>161</sup> The Court gave its seal of approval to the new PTO examination guidelines.

<sup>162</sup> Request for Comments on Proposed Examination Guidelines for Computer-Related Inventions, 60 FED. REG. 28,778 (Department of Commerce, Patent and Trademark Office, June 2, 1995).



was to provide a structural framework for training examiners how to handle software-related inventions. The PTO officially adopted the Guidelines on March 29, 1996<sup>163</sup>—final proof that the PTO's three-decades-long policy of discouraging patent applications claiming software-related inventions was over.

#### IV. *STATE STREET BANK* AND THE MODERN ERA

The *Alappat* decision and the PTO's adoption of the examination Guidelines for Computer-Related Inventions ended any debate over whether applicants could obtain patents on software-related inventions. The remaining issue among members of the patent bar was whether such patents, once obtained, would be enforceable. The patent bar generally assumed that new applications, carefully prepared according to the new Guidelines, would be enforceable as they came before the courts, perhaps five or ten years after the Guidelines came into effect. But what about the many patents issued prior to the Guidelines' adoption, granted by PTO examiners acting in good faith but technically contrary to PTO policy? Would courts analyze such patents following the pre-*Alappat* logic, rendering them unenforceable, or would they be good, enforceable patents, provided they met all other criteria for validity? It was a very significant question. Consequently, when *State Street Bank*<sup>164</sup> was filed, it almost immediately became the subject of much attention and speculation among members of the patent bar pondering, not the future, but the present viability of software patents.

The patent involved in *State Street Bank*, U.S. Patent No. 5,193,056 (the '056 patent), issued on March 9, 1993, well before either *Alappat* or the PTO adopted the Guidelines. The '056 patent covered a software-implemented financial process,<sup>165</sup> an invention far different in nature from the more physical inventions that made up the bulk of the software-related cases the Federal Circuit considered. For example, the invention in *Arrhythmia*, the last related infringement case the Federal Circuit considered, addressed analysis of electrocardiographic signals generated by the human heart.<sup>166</sup> The signals in *Arrhythmia* were tied directly to a concrete physical measurement. Similarly, the *Alappat* case dealt with techniques for

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<sup>163</sup> See Examination Guidelines for Computer-Related Inventions, 61 FED. REG. 7478, 7479 (Department of Commerce, Patent and Trademark Office, February 28, 1996).

<sup>164</sup> *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d (BNA) 1596 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999).

<sup>165</sup> See U.S. Patent No. 5,193,056 to R. Todd Boes, entitled, "Data Processing System for Hub and Spoke Financial Services Configuration."

<sup>166</sup> See *Arrhythmia Research Tech. Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1054, 22 U.S.P.Q.2d (BNA) 1033, 1034 (Fed. Cir. 1992).

improving the quality of a signal display trace on an oscilloscope screen.<sup>167</sup> The resulting smoother waveform display was the embodiment of “a useful, concrete and tangible result” according to the court.<sup>168</sup> This practical application of an abstract idea was crucial to its finding of statutory subject matter.<sup>169</sup> Could State Street Bank’s ‘056 patent, drafted well before the existence of the PTO Guidelines, and based entirely on financial software, be construed as encompassing a practical application of an abstract idea? Could a financial calculation be considered a useful, concrete and tangible result in the same fashion as an analysis of electrocardiographic signals or a smoother signal display on a CRT screen? To the informed observer, *State Street Bank* seemed to present difficult issues that made enforcing the ‘056 patent troublesome, if not unlikely.

State Street Bank and Signature Financial Group, Inc., both act as custodians and accounting agents for multi-tiered partnership fund financial services.<sup>170</sup> Signature is the assignee of the ‘056 patent. The patented invention is generally directed to a data processing system for implementing an investment structure developed for use in Signature’s business as an administrator and accounting agent for mutual funds.<sup>171</sup> The patented invention implements the “Hub and Spoke” system, whereby mutual funds (spokes) pool their assets in an investment portfolio (hub) organized as a partnership.<sup>172</sup> This arrangement provides the mutual fund administrator with the advantageous combination of economies of scale, as well as the tax advantages of a partnership.<sup>173</sup>

The case reached the Federal Circuit on appeal from a grant of summary judgment holding the ‘056 patent invalid under section 101 as claiming non-statutory subject matter. The court reversed and remanded, stating its holding thus:

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 or reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.<sup>174</sup>

The opinion took a year and a half to emerge from the Federal Circuit, suggesting that it was controversial within the court. Perhaps the notion that something as ethereal as a “final share price” could be “concrete and

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<sup>167</sup> See *In re Alappat*, 33 F.3d 1526, 1537, 31 U.S.P.Q.2d (BNA) 1545, 1551 (Fed. Cir. 1994).

<sup>168</sup> *Id.* at 1544, 31 U.S.P.Q. 2d (BNA) at 1557.

<sup>169</sup> See *id.* at 1544, 31 U.S.P.Q.2d (BNA) at 1557.

<sup>170</sup> See *State St. Bank*, 149 F.3d at 1370, 47 U.S.P.Q.2d (BNA) at 1598.

<sup>171</sup> See *id.*, 47 U.S.P.Q. 2d (BNA) at 1598.

<sup>172</sup> See *id.*, 47 U.S.P.Q. 2d (BNA) at 1598.

<sup>173</sup> See *id.*, 47 U.S.P.Q. 2d (BNA) at 1598.

<sup>174</sup> *Id.* at 1373, 47 U.S.P.Q.2d (BNA) at 1601.

tangible” was a bit difficult for all members of the court to accept. Nonetheless, the holding is clear and unambiguous. As the lower court based its decision on the *Freeman-Walter-Abele* test, the Federal Circuit again pointed out that test has “little, if any, applicability to determining the presence of statutory subject matter.”<sup>175</sup> The court also emphasized that “after *Diehr* and *Alappat*, the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a ‘useful, concrete and tangible result.’”<sup>176</sup>

The court then put to rest the so-called business method exception to patentability.<sup>177</sup> The PTO raised the business method exception because the method claimed in the subject patent was a software-based process at the head of financial business services provided by both parties. The court pointed out that no such exception ever existed in CCPA or Federal Circuit precedent.<sup>178</sup> Rather, the court explained that the business method exception was really an aspect of the abstract idea exception to patentability.<sup>179</sup> In hammering home the non-existence of the business method exception, the Federal Circuit noted with approval the exception’s deletion from the Manual of Patent Examining Procedures<sup>180</sup> and quoted the PTO Examination Guidelines for Computer-Related Inventions, “Office personnel have had difficulty in properly treating claims directed to methods of doing business. Claims should not be categorized as methods of doing business. Instead such claims should be treated like any other process claims.”<sup>181</sup> The court adopted the Guidelines’ approach. “We agree that this is pre-

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<sup>175</sup> *Id.* at 1374, 47 U.S.P.Q.2d (BNA) at 1601.

<sup>176</sup> *Id.*, 47 U.S.P.Q.2d (BNA) at 1602.

<sup>177</sup> The business method exception to patentability simply stands for the proposition that methods of doing business are outside the scope of patentable subject matter defined by section 101. The popular press has adopted the position that *State Street* stands for the position that business methods are patentable. Although this aspect of the case is very significant from a practical point of view (i.e., increased patent filings in the area of business methods), the authors believe it is only a corollary to an even broader principle supported by the opinion, namely, that useful transformation of data by software is patentable.

<sup>178</sup> See *State St. Bank*, 149 F.3d at 1375, 47 U.S.P.Q.2d (BNA) at 1603 (citing Rinaldo Del Gallo, III, *Are “Methods of Doing Business” Finally out of Business as a Statutory Rejection?*, 38 IDEA 403, 435 (1998)).

<sup>179</sup> See *id.*, 47 U.S.P.Q. (BNA) at 1603.

<sup>180</sup> See *id.* at 1377, 47 U.S.P.Q.2d at 1604 (citing the 1996 version of the Manual of Patent Examining Procedure in which § 706.03(a) was deleted). Prior to its removal, 706.03(a) of the Manual of Patent Examining Procedure read “Though seemingly within the category of process or method, a method of doing business can be rejected as not being within the statutory classes. M.D.E.P. §706.03(a) (1994) (citations omitted).

<sup>181</sup> *State St. Bank*, 149 F.3d at 1377, 47 U.S.P.Q.2d (BNA) at 1604 (citing Examination Guidelines, 61 FED. REG. 7478, 7479 (1996)).

cisely the manner in which this type of claim should be treated,"<sup>182</sup> leaving no ambiguity to readers of its opinion.

A potential criticism of *State Street* was that its holding could be read as inconsistent with *Benson* or *Flook*. But the Supreme Court denied *certiorari* in *State Street*, strongly suggesting that such potential criticisms have no merit. A remaining question was whether other panels of the Federal Circuit would follow *State Street Bank*. Although *Alappat* and *Trovato*, both *en banc* decisions, laid the foundation for a unified court in this area of law, uncertainty was generally the only certainty after *State Street Bank*.

The recently-decided case of *AT&T Corp. v. Excel Communications, Inc.* largely quelled that uncertainty.<sup>183</sup> The strength and importance of *State Street Bank* was further bolstered by the fact that a different panel of the Federal Circuit decided *Excel*.<sup>184</sup> The *Excel* case reached the Federal Circuit under circumstances nearly identical to those in *State Street Bank*—summary judgment holding all of the subject claims invalid for failure to qualify as statutory subject matter under section 101.<sup>185</sup> The claimed method was essentially a process that facilitated telephone service fee allocations among different carriers.<sup>186</sup> The point of the invention was to allow computers to generate bills easily and accurately.<sup>187</sup> In reversing the lower court's holding of invalidity, the Federal Circuit issued an opinion that both reenforced and expanded upon *State Street Bank*.

The court first acknowledged the "sea-changes in both law and technology,"<sup>188</sup> and in a few paragraphs summarized the history this article has provided thus far.<sup>189</sup> It then looked to the written description of the patent claim at issue. The court found that the claims were not directed simply to a mathematical principle, but to the application of that principle to a "non-abstract result that facilitates differential billing of long-distance calls."<sup>190</sup> The court also addressed the "physical transformation" issue, pointing out that physical transformation is not a rigid legal requirement, but merely one example of a useful application of a mathematical algorithm.<sup>191</sup> Finally, the court addressed Justice Stevens' twenty-year-old dissent in *Dia-*

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<sup>182</sup> *Id.*, 47 U.S.P.Q. 2d (BNA) at 1604.

<sup>183</sup> *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 50 U.S.P.Q.2d (BNA) 1447 (Fed. Cir. 1999), *cert. denied* 120 S. Ct. 368 (1999).

<sup>184</sup> *State Street Bank* was decided by Judges Rich, Plager and Bryson. *Excel* was decided by Judges Plager, Clevenger, and Rader. Judge Plager, the only judge to hear both *State Street Bank* and *Excel*, authored the *Excel* opinion.

<sup>185</sup> *See Excel*, 172 F.3d at 1355, 50 U.S.P.Q.2d (BNA) at 1449.

<sup>186</sup> *See id.* at 1353, 50 U.S.P.Q.2d (BNA) at 1448.

<sup>187</sup> *See id.* at 1354, 50 U.S.P.Q.2d (BNA) at 1448.

<sup>188</sup> *Id.* at 1356, 50 U.S.P.Q.2d (BNA) at 1450.

<sup>189</sup> *See id.* at 1356-58, 50 U.S.P.Q.2d (BNA) at 1450-51.

<sup>190</sup> *Id.* at 1358, 50 U.S.P.Q.2d (BNA) at 1452.

<sup>191</sup> *Id.*, 50 U.S.P.Q. 2d (BNA) at 1952.

*mond v. Diehr*. In that dissent, Justice Stevens declared that all inventions based on computer programs should be unpatentable. Stevens had two justifications for his approach: first, the case law did not establish unambiguous rules that would enable one to determine with a fair degree of accuracy which inventions were patentable; and second, inclusion of the term "algorithm" within the category of unpatentable inventions could suggest that almost any process should be unpatentable.<sup>192</sup> The *Excel* opinion notes that the first concern is no longer an issue because *Alappat* and *State Street Bank* have highlighted the "utility" rule for compliance with section 101<sup>193</sup>—a relatively easy rule to follow. The second concern is to be "laid to rest once the focus is understood to be not on whether there is a mathematical algorithm at work, but on whether the algorithm-containing invention, as a whole, produces a tangible, useful, result."<sup>194</sup>

*Excel* is a strong follow up to *State Street Bank*; each supports the other. These two cases, particularly taken in the context of the *en banc* *Alappat* and *Trovato* decisions, strongly suggest that Federal Circuit law on the patentability of software-related inventions is now firmly established. Moreover, the denial of *certiorari* in both *Excel* and *State Street* suggests that the Supreme Court has deferred the task of interpreting the scope of section 101 to the Federal Circuit.

#### CONCLUSION

The sea-changes in both law and technology that the *Excel* court acknowledged are really the substance of this paper. Over the past three decades, developments in computer, software and communication technology have occurred at an unprecedented pace. Manufacturing efficiencies, software evolution, the growth of wide bandwidth optical technologies and the commercialization of space all occurred simultaneously to produce the cheap, powerful international communication link known as the Internet. The result is a redefinition of commercial and business practices. Along with these changes comes a new definition of what is "useful." Theory and knowledge that not long ago were the substance of books and abstract study, may now be implemented easily into practical, useful business tools. This implementation is accomplished through the medium of software operating on computers that are consistently more powerful, yet cheaper and more reliable than ever before. This sea-change in computer and software technology is not opaque to the courts, and surely is the

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<sup>192</sup> See *Diamond v. Diehr*, 450 U.S. 175, 219, 209 U.S.P.Q. (BNA) 1, 22 (1981) (Stevens, J., dissenting).

<sup>193</sup> See *Excel*, 172 F.3d at 1361, 50 U.S.P.Q.2d (BNA) at 1454.

<sup>194</sup> *Id.*, 50 U.S.P.Q. 2d (BNA) at 1454.

driving force behind the changes in the law of software patentability recounted here.

Although described as a sea-change, the position of the Patent courts on the present subject matter really has not varied widely over the decades. The basic precept that software-based inventions should be treated in essentially the same manner as other inventions flows from *Prater* through *State Street Bank* and *Excel*. Had it not been for the PTO effectively delaying the evolution of the law, it is certainly conceivable that the ideas expressed in *State Street Bank* could have been seen in court opinions two decades ago. Yet, it is possible that the PTO's delaying tactics prevented the law from outpacing technology, and forced a more thorough and probing analysis of the boundaries of patentable subject matter in the software area.

Speculation aside, it seems clear that *State Street Bank* is neither an anomaly in law nor a decision by an aberrant panel of the Federal Circuit without strong precedential significance. On the contrary, *State Street Bank* seems to be fully consistent with the long term philosophy of the Federal Circuit and its predecessor court, the CCPA. We conclude that *State Street Bank* is no fluke, but a decision of substantial importance and precedential impact. It will, in the words of Justice Stevens, "establish rules that enable a conscientious patent lawyer to determine with a fair degree of accuracy which . . . program-related inventions will be patentable" and—we might add—enforceable.<sup>195</sup> *State Street Bank* is a timely decision that is consistent both with the trends of the past and the needs of today.

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<sup>195</sup> *Diehr*, 450 U.S. at 219, 209 U.S.P.Q. (BNA) at 22.