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Patent Law - The Next-to-Last Step to Software Patentability?

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PATENT LAW—THE NEXT-TO-LAST STEP TO SOFTWARE PATENTABILITY?—*Diamond v. Diehr*, 450 U.S. 175 (1981).

INTRODUCTION

Since the late 1960's, the question of legal protection for computer software has been the basis for battle between the Court of Customs and Patent Appeals (CCPA) and the Patent and Trademark Office (PTO). The Patent Office generally has considered processes using mathematical formulas to be unpatentable subject matter under 35 USC § 101.[1] The CCPA, considering appeals from the

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1. 35 U.S.C. § 101 (1976) states the following:
Inventions patentable

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, subject to the conditions and requirements of this title.

35 U.S.C. § 102 (1976) provides:
Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered

PTO Board of Appeals, consistently has reached the opposite conclusion.

Prior to 1981, the Supreme Court delivered only three major decisions which addressed the issue.[2] Although the Court did not find the inventions claimed in those cases to be patentable, it did not reject the possibility that claims involving computer programs could be patentable subject matter under § 101. The rapid technological advances in computers in the past thirty years have meant a tremendous growth in sales in the computer industry.[3] The software industry has grown as rapidly as computer technology,[4] because without software, computer hardware is useless.[5] The question of patentability is one which the computer industry would like resolved quickly, because the profits in question could be sizeable if the courts hold that software is patentable. In the most recent attempt to resolve the battle between the CCPA and the PTO, the Supreme Court, in a 5-4 decision in *Diamond v. Diehr*,[6] determined that a process which requires the use of a mathematical formula and a computer is patentable subject matter under § 101.

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not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

35 U.S.C. § 103 (1976) states the following:

Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Parker v. Flook, 437 U.S. 584 (1978), Dann v. Johnston, 425 U.S. 219 (1976), Gottschalk v. Benson, 409 U.S. 63 (1972).

3. *Amicus curiae* briefs submitted in *Parker v. Flook* indicate that in 1976, 500,000 computer systems made by firms in America are in use throughout the world. The estimated value of these computers is $85.7 billion. Estimates also indicate that by this year, 1,100,000 computers, valued in excess of $138 billion, will be in use. Parker v. Flook, 437 U.S. 584 (1978) (*amicus curiae* brief of Computer and Business Equipment Manufacturers' Association, at 17-18).

4. *Id.* at 18.

5. *See infra* text at note 20.

6. 450 U.S. 175 (1981).

THE CASE

In 1975, respondents, Diehr and Lutton, employees and assignors of Federal-Mogul, filed a patent application which claimed a process for molding raw rubber into cured precision parts. The process required the use of a mold to shape the uncured rubber under heat and pressure consistently to produce functional products. The respondents indicated that a perfect cure depended on several factors, including inherent characteristics of the product being produced, the temperature of the mold, and particularly the amount of time the article remained in the mold. Using the Arrhenius equation,[7] one can calculate the time the rubber should re-

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7. Typical claims in respondent's patent application are the following:

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

providing said computer with a data base for said press including at least,

natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the press,

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

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

constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is

$\ln v = cz + x$

where v is the total required cure time,

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

opening the press automatically when a said comparison indicates equivalence.

2. The method of claim 1 including measuring the activation energy constant for the compound being molded in the press with a rheometer and automatically updating said data base within the computer in the event of changes in the compound being molded in said press as measured by said rheometer.

11. A method of manufacturing precision molded articles from selected synthetic rubber compounds in an openable rubber molding press having at least one heated precision mold, comprising:

(a) heating said mold to a temperature range approximating a predetermined rubber curing temperature,

main in the mold to produce the perfect cure, but to make this calculation one must know the temperature within the mold. Before respondents claimed their invention, the industry considered the temperature factor to be an uncontrolled variable. Consequently, the general practice had been to remove the molded product after the shortest possible time in which all parts of the final product could be cured. This process relied only on estimations, and often resulted in overcuring or undercuring the final product.

To avoid this problem, respondents claimed as a part of their process a means for constantly measuring the temperature inside the mold. This temperature was relayed to a computer which iteratively[8] calculated the proper cure time using the Arrhenius equation. At the point when the calculated time equaled the actual time that the mold had been closed, the computer automatically opened the mold. Respondents claimed that the continuous tem-

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(b) installing prepared unmolded synthetic rubber of a known compound in a molding cavity of a predetermined geometry as defined by said mold,

(c) closing said press to mold said rubber to occupy said cavity in comformance with the contour of said mold and to cure said rubber by transfer of heat thereto from said mold,

(d) initiating an interval timer upon the closure of said press for monitoring the elapsed time of said closure,

(e) heating said mold during said closure to maintain the temperature thereof within said range approximating said rubber curing temperature,

(f) constantly determining the temperature of said mold at a location closely adjacent said cavity thereof throughout closure of said press,

(g) repetitively calculating at frequent periodic intervals through out closure of said press the Arrhenius equation for reaction time of said rubber to determine total required cure time v as follows:

$$\ln v = cz + x$$

wherein c is an activation energy constant determined for said rubber being molded and cured in said press, z is the temperature of said mold at the time of each calculation of said Arrhenius equation, and x is a constant which is a function of said predetermined geometry of said mold,

(h) for each repetition of calculation of said Arrhenius equation herein comparing the resultant calculated total required cure time with the monitored elapsed time measured by said interval timer,

(i) opening said press when a said comparison of calculated total required cure time and monitored elapsed time indicates equivalence, and

(j) removing from said mold the resultant precision molded and cured rubber article."

8. "Repetitiously."

perature measuring process, the calculation process and the opening of the press were all new in the art.

The patent examiner rejected these claims, relying on *Gottschalk v. Benson*,[9] but never determined whether the process was novel, because in his view the respondents' claims which involved the use of the computer were drawn to non-statutory subject matter under § 101. The examiner also concluded that the remaining steps in the process were unpatentable because they were conventional in nature, and found that respondents were seeking protection for a computer program which operates a rubber molding process.

The Patent and Trademark Office Board of Appeals affirmed the examiner's finding, but on appeal the CCPA reversed,[10] indicating that claims which the applicant draws to otherwise statutory subject matter do not become non-statutory simply because the process involves the use of a computer. The CCPA also decided that respondents claimed an improved process for molding and curing rubber products, but not a mathematical algorithm[11] or an improved method of calculation.

The Solicitor General and acting Commissioner of Patents and Trademarks, on behalf of the Government, then petitioned for certiorari, claiming that the CCPA's decision conflicted with other Supreme Court decisions. The Supreme Court granted the writ[12] to resolve the question.[13]

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9. 409 U.S. 63 (1972).

10. *In re* Diehr, 602 F.2d 982 (C.C.P.A. 1979).

11. The Courts have not been able to decide upon the definition of "algorithm." One definition is a "fixed step-by-step procedure for solving a complex problem." *But see Diehr* at 186, n. 9.

12. Diamond v. Diehr, 445 U.S. 926 (1980).

13. At that time, the Supreme Court heard arguments not only on the *Diehr* question, but also on a companion case designated *Diamond v. Bradley*, in which the claimed invention allowed information stored in scratchpad registers (temporary storage in the computer's memory) to be more easily modified using a "firmware" module, a hardware component permanently encoded with a microprogram to perform a specific function, located between the scratchpad registers and the operating system of the computer. In *Bradley*, the examiner, citing *Parker v. Flook*, rejected the claims as unpatentable subject matter under 35 U.S.C. § 101 because they involved a mathematical algorithm. The CCPA reversed, as they did in *Diehr*, finding the invention to be a combination of tangible hardware elements including microprogrammed firmware. The Supreme Court, in a 4-4 decision reported at 450 U.S. 381 (1981) (the Chief Justice did not take part) affirmed the decision of the lower court without issuing an opinion.

The Government, the petitioner in *Diehr*, argued[14] that the most recent Supreme Court decision, *Parker v. Flook*,[15] controlled the issue the case presented. The Court in *Flook* had held that a claim for an improved method of calculation, even when tied to a specific end use, was unpatentable subject matter under § 101. Petitioner argued further that *Flook* stated a two-step test which should be applied to determine whether a claimed invention is statutory subject matter under § 101: (1) The examiner should eliminate any claims which recite unpatentable scientific principles, ideas, concepts, formulas, or phenomena of nature; and (2) he then should determine whether the remaining claims are novel. If they are not novel, then they are not statutory subject matter under § 101. Petitioner also claimed that the Court should not reexamine its holding in *Flook*, because Congress, if it disagreed with the Court's decision, must change the law, the Court having no power to do so.[16]

Respondents argued that their application as presented to the PTO did not claim a computer program[17] or mathematical formula, but instead claimed a process involving the change of raw rubber into a new state through molding under pressure and heat. The novelty of the claims, according to the respondents, lay in the constant temperature measurement and continued computation of cure time through the use of a computer and the Arrhenius equation. Respondents did not seek to preempt the use of any mathematical formula; they only wanted to stop others from using the Arrhenius equation in relation to the other steps (including the use of a computer) in the process they claimed in their patent application. In particular the respondents argued that a computer is not necessary at all for their process, but by continuous recalculation of cure time the risk of over- or under-curing was significantly reduced.

The Court, in the majority opinion, determined that when considering whether a claim is patentable subject matter under § 101, the examiner must look at the claimed invention as a whole and not in its constituent parts. Here, according to the majority, respondents claimed an improved process. The fact that the pro-

14. Diamond v. Diehr, 450 U.S. 175 (1981), and Diamond v. Bradley, 450 U.S. 381 (1981), both were argued on October 14, 1980. The reports of the arguments are found at 49 U.S.L.W. 3279 (October 21, 1980).

15. 437 U.S. 584 (1978).

16. *Id.* at 595.

17. *See supra* note 7.

cess involved a calculation by a computer, which by itself is unpatentable subject matter, is irrelevant to the finding whether the process as a whole is patentable. Further, the examiner must decide after determining that the claim is patentable subject matter, whether the claimed invention is novel under § 102[17.1] or obvious under § 103.[17.2] The Court then decided that the respondents' claims for an improved process for curing rubber were patentable subject matter under § 101.

BACKGROUND

The problem *Diehr* presented to the Court becomes clearer when viewed in the history and technical make-up of computers.[18] In 1946, inventors developed the first all-purpose computer, ENIAC.[19] ENIAC's basic drawback was that it was externally programmed, requiring the operator to rewire much of its circuitry before each new problem. Shortly after the development of ENIAC, however, John von Neumann, a mathematician at Princeton University, developed a means by which the instructions for the operation of the computer could be stored in the computer's memory. Because the operator could enter the processor program (the operating system), the source program (the application program) and the data in the same manner, preparing the machine for a given task was greatly simplified. This internally programmed computer is the type generally used today.

The operating system is that portion of the computer which internally controls both the manipulation of data and the instructions which the programmer supplies to it by means of his source program. Without the back-up operating system, the computer is simply a set of electronic equipment, incapable of performing any task. Once internally programmed, however, the computer is capable of receiving and processing the source program, the special instructions which the programmer gives the computer to tell it how

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17.1 35 U.S.C. § 102 (1976). For the text of § 102 *see supra* note 1.

17.2 35 U.S.C. § 103 (1976). For the text of § 103 *see supra* note 1.

18. The general background of the problem has been reviewed well elsewhere. *See, e.g.*, Gemignani, *Legal Protection for Computer Software: The View From '79*, 7 RUT. J. COMPUTERS, TECH. & L. 269 (1980); Novick & Wallenstein, *The Algorithm and Computer Software Patentability: A Scientific View of a Legal Problem*, 7 RUT. J. COMPUTERS, TECH. & L. 313 (1980). *See also*, Diamond v. Diehr, 450 U.S. at 194 (Stevens, J., dissenting).

19. ENIAC is an acronym for Electronic Numerical Integrator and Calculator.

to perform a particular job.[20]

Consequently, a basic philosophical problem has confronted the courts. The computer itself ("hardware")[21] requires the operating system program ("software" or "firmware")[22] before it becomes useful for any practical purpose. The question which arises is whether the "computer" is the hardware portion alone, or the hardware plus the software package which comprises the operating system. Is it the program which solves the problem, or is it the eventual process occurring internally in the computer? "Computers," being machines, fall within patentable subject matter under § 101,[23] but does a computer under the statute include the software operating system? If it does, then the natural conclusion is that the source program, also software, should be patentable subject matter under § 101. This is the question the PTO, the CCPA and the Supreme Court have tried to answer, but without much success.

The United States Supreme Court defines a process as a mode of treatment of certain materials to produce a given result—an act or series of acts which transform or reduce some subject matter into another state or thing.[24] A well-known principle in patent law is that a law of nature is not patentable,[25] but a new process or machine which uses a law of nature is not *per se* unpatentable.[26] Similarly, ideas are not patentable.[27] The CCPA incorporated

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20. The "operating system" is "software," (*see* note 22) and consists of a control program which directs and supervises all functions of the computer. Included within the operating system are (1) a compiler, an operational program that translates a source program (the user's application program) into machine-usable form (*i.e.*, object code); (2) utility and service programs which perform basic data processing tasks, and (3) operational programs which are part of the operating system library. The "source programs" direct the computer, supported by the control program (operating system), to perform specific user-oriented jobs. *Computers in Litigation Support* 248-49 (W.E. Cwicklo ed. 1979).

21. "Hardware" is the physical equipment including the computer and peripheral devices. *Id.* at 248.

22. "Software" is the totality of programs which make the hardware perform its jobs. The software works within the confines of the hardware and is usually divided into the "operating system" and the "source programs." *Id.* at 248-49.

23. *See supra* note 1.

24. Cochrane v. Deener, 94 U.S. 780, 788 (1876).

25. Gottschalk v. Benson, 409 U.S. 63, 67 (1973).

26. *See, e.g.*, Parker v. Flook, 437 U.S. 584, 590 (1976); Funk Brothers Seed Co. v. Kalo Co., 333 U.S. 127 (1948); Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86 (1939).

27. *See, e.g., In re* Yuan, 188 F.2d 377 (C.C.P.A. 1951).

these principles into the "mental steps doctrine,"[28] a concept it then used to deny patents for inventions which were merely claims for methods of computation or mathematical formulas.

In 1965, the President established a commission to suggest revisions to the Patent Act.[29] This commission recommended that computer programs[30] should not be patentable under any circumstance. The PTO then established guidelines making programs unpatentable, but indicating that a programmed computer could be part of a patentable process when the inventor combined it with non-obvious elements to produce a new physical result.[31] Legislation to this effect failed in Congress.[32]

Soon the Court of Customs and Patent Appeals rejected the PTO guidelines, as well as the "mental steps doctrine," in *In re Prater*,[33] where the CCPA decided that a process which may be performed mentally is not unpatentable if the process claims also show that one may perform the process without mental operations. The CCPA in *In re Bernhart*[34] reaffirmed *Prater* and indicated further that a computer programmed with a novel program is physically different from the unprogrammed computer and is, therefore, patentable as a new machine or new improvement.[35] The only aspect of the mental steps doctrine remaining was a prohibi-

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28. The mental steps doctrine had three main elements: (1) Processes consisting only of mental steps are unpatentable; (2) a process involving both mental and physical steps is unpatentable if the only novelty lies in the mental steps; and (3) a process which involves mental and physical steps is patentable if the novelty or advancement of the art lies in the physical steps. *In re* Abrams, 188 F.2d 165, 166 (C.C.P.A. 1951).

29. Exec. Order No. 11,215, 30 Fed. Reg. 4661 (1965).

30. The Commission defined "program" as a series of instructions which control or condition the operation of a data processing machine. *See* Gemignani, *supra* note 18, at 295.

31. 33 Fed. Reg. 15,609 (1968).

32. S. 1042 and H.R. 5924, 90th Cong., 1st Sess. (1967).

33. 415 F.2d 1393 (C.C.P.A. 1969). In *Prater* a computer was used to process spectrographic data using well-known equations. The PTO rejected the claims under the mental steps doctrine because the claimed method disclosed an unpatentable mathematical principle. The rest of the claims for the machine fell within the prior art and were considered unpatentable.

34. 417 F.2d 1395 (C.C.P.A. 1969). Bernhart's invention was a method for illustrating a three-dimensional object in two dimensions using a computer and plotter which already existed. The only novelty involved was a set of mathematical equations which the computer solved. The C.C.P.A. noted that in the absence of human involvement, there was no mental process involved.

35. *Id.* at 1400.

tion on patentability when the patent would amount to a total preemption of the use of a scientific principle or mathematical equation.[36] This was known, then, as the "preemption doctrine."

In 1970, the CCPA rejected the PTO's use of the "point of novelty" approach, which required the examiner to determine whether the claimed novelty or advancement of the art rested in an unpatentable step, such as a mental operation. If so, the entire claim was rejected under § 101 because the claim was drawn to non-statutory subject matter.[37] The CCPA also adopted the "technological arts" standard, defining it in *In re Benson*:[38] computers, regardless of their usage, are within the technological arts and are patentable subject matter under § 101. This set the scene for the Supreme Court to enter the picture in *Gottschalk v. Benson*.[39] In *Benson*, the Supreme Court held that the claimed invention was merely an algorithm and, as such, was unpatentable. The Court determined that Benson's claim was so broad that if a patent were granted, *Benson* would preempt the use of the algorithm by others, and any patent issued would be a patent on the equation itself. The Court did not rule on the "mental steps doctrine," but explicitly stated that its decision did not find programs to be unpatentable subject matter. Instead, the Court stated, as it has consistently since, that any change in the statutory requirements under § 101 must be by act of Congress.[40]

In 1976, the Supreme Court again issued a decision on program patentability in *Dann v. Johnston*.[41] In that case the inventor developed a record-keeping machine which included a programmed digital computer. The CCPA, after reversing the Board of Appeals' rejection of Johnston's patent, found the system to be patentable subject matter under § 101 because the claims were drawn for a machine. In a vigorous dissent, Judge Rich implied that the court, after *Benson*, should no longer indulge in the

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36. *Id.* at 1399.

37. *See In re* Musgrave, 431 F.2d 882, 889 (C.C.P.A. 1970).

38. 441 F.2d 682, 688 (C.C.P.A. 1971), *rev'd sub nom.* Gottschalk v. Benson, 409 U.S. 63 (1972).

39. 409 U.S. 63 (1972). Benson claimed a method for programming a computer to convert a decimal number into its binary notation. Because binary notation is the form a computer uses, the program was of great interest to those working with computers. 409 U.S. at 72.

40. *Id.* at 71-73.

41. *In re* Johnston, 502 F.2d 765 (C.C.P.A. 1974), *rev'd sum nom.* Dann v. Johnston, 425 U.S. 219 (1976).

fiction that a new program changes an old computer into a new machine.[42] According to Judge Rich, to decide, as the majority did, a question of patentability on the manner in which a claim was written exalted form over substance.[43] The Supreme Court reversed the CCPA and decided that Johnston's patent application must be rejected because the claimed invention was obvious.[44]

After *Johnston*, the CCPA consistently interpreted *Benson* to mean that computer-related processes were patentable so long as the claimed invention did not preempt the use of the algorithm itself. The CCPA then developed a two-prong test for finding a program claim unpatentable. First, the examiner must determine whether the claim recites an algorithm, and, second, if an algorithm is found, the claim must be analyzed to see whether it preempts the use of the algorithm.[45] Only when the claim met both prongs of this test would the CCPA apply *Benson* and deny the patent.

In this way, the stage was set for real confusion. The CCPA next stated that even if the only novelty in an invention was an algorithm, the invention could still be statutory subject matter.[46] In *Parker v. Flook*,[47] the Supreme Court, in a 6-3 decision, vehemently disapproved of the reasoning of the CCPA. Flook's claimed invention was a method for updating alarm limits, a factor important in detecting abnormal or dangerous states in catalytic conversion of hydrocarbons. Flook's invention involved (1) measurement of the present value of those variables used to compute alarm limits; (2) the calculation of the new updated alarm limit using an algorithm; and (3) replacement of the old alarm limit by the new value. The Supreme Court rejected Flook's claims, indicating that the presence of post-solution activity does not in itself make the

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42. *Id.* at 773. This decision was an attempt to narrow the holding in *Benson*, 409 U.S. 631 because there the claims were drafted in process form, but in *Johnston*, 425 U.S. 219, they were drafted in apparatus form.

43. *Id.* at 774.

44. Dann v. Johnston, 425 U.S. 219 (1976).

45. *See, e.g., In re* Freeman, 573 F.2d 1237 (C.C.P.A. 1978) and *In re* Toma, 575 F.2d 872 (C.C.P.A. 1978). In *Freeman*, the C.C.P.A. indicated that "post-solution" activity is not a determining factor. "Post-solution" activity is the ultimate purpose for which solution of the mathematical formula is used. This played an important role in the decision of *Parker v. Flook* and *Diamond v. Diehr*, discussed *infra*.

46. 575 F.2d at 876.

47. 437 U.S. 584 (1978).

method or process eligible for patent protection.[48] Again the Supreme Court indicated that a process is not unpatentable simply because it contains a law of nature or algorithm, but added that a patentable *process* must be new and useful.[49] Whether the algorithm is new is irrelevant.[50] Although the Court was construing § 101 of the Patent Act, which relates to the subject matter of patents, and not § 102 or § 103, which relate to novelty and obviousness of the invention,[51] the Court required a determination of whether the novelty of a claimed process lay only in an improved method for calculation or a mathematical formula. If this were the case, the claimed invention did not describe patentable subject matter under § 101.[52] For the claim to be patentable, some other concept in the application must be novel.[53] The Supreme Court also determined that *Benson* was not to be limited to claims which preempted the use of an algorithm, as the CCPA had believed.[54] The stage was now set for the Supreme Court, in *Diamond v. Diehr,* to clarify the issue of the patentability of processes which use programmed computers.

ANALYSIS

The Supreme Court's majority opinion, written by Justice Rehnquist, begins by stating that *Diehr* requires a construction of § 101, as have previous cases. In construing the section, the Court summarized its history and found that the respondents claim a "physical and chemical process for molding . . . synthetic rubber products"[55] which is statutory subject matter under § 101. Relying on the definition of process in *Cochrane v. Deener,*[56] the Court found respondents' claims to involve changing uncured rubber into a different thing, a precision molded product, and therefore to be within the traditional protection of patent laws.[57]

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48. *Id.* at 590.
49. *See supra* note 26.
50. 437 U.S. at 592.
51. *Id.* at 588. *See supra* note 1 for the text of § 102 and § 103.
52. *Id.* at 595, n. 18.
53. *Id.* at 594. The Court required that the examiner consider an algorithm to be a part of prior art and then determine whether some other novel aspect of the claim exists.
54. *Id.* at 589-90.
55. 450 U.S. at 184.
56. 94 U.S. 780 (1876).
57. 450 U.S. at 184.

The majority expressly stated that its decision was not affected in any way by the simple fact that the claims are dependent on the use of a mathematical equation and a programmed computer for several steps of the process. In a meager attempt to distinguish *Flook*,[58] in which the Court had found a computer process for updating alarm limits to be unpatentable subject matter under § 101, the majority stated that Flook failed to explain how one determined the variables used in this calculation procedure, and that he did not disclose any chemical processes at work. The Court decided that the claims in *Flook*, therefore, only provided a formula to update alarm limits.[59]

As the dissenting opinion, written by Justice Stevens, correctly indicates, however, the patent application in *Diehr* mentions nothing about the equipment used in the process except the usage of a rheometer to measure temperature constantly, and nothing about any process variables used in the calculation. In fact, the dissent states that the respondents' claims offer nothing new about the process of curing rubber.[60] The dissent then argues that (1) the patent application does not disclose anything unusual about the device which constantly measures the temperature (a rheometer); (2) devices for constantly measuring temperatures are well-known (a thermometer, for example); and, most importantly, (3) the only difference between ordinary means of operating a molding press and respondents' claims is calculation of the solution of a mathematical formula using a digital computer. In the opinion of the dissenters, therefore, the process is not newly discovered; the respondents claim a method for updating cure time by iterative calculation much the same way that Flook's method claimed. Just as the petitioners argued, distinguishing *Diehr* from *Flook* is a difficult task because both involve (1) an initial calculation; (2) continual remeasurement and recalculation; and (3) a use for the value obtained from the calculation.[61] This analysis, as discussed later, misses the point, however.

The dissent indicates that the majority misapplied *Flook* by confusing subject matter requirements of § 101 and novelty re-

58. Parker v. Flook, 437 U.S. 584 (1978).

59. 450 U.S. at 186.

60. *Id.* at 205-06 (Stevens, J., dissenting). See respondent's claims, note 7, *supra*. Curing rubber is a well-known process originally patented by Charles Goodyear over a century ago. *See* note 25 of the dissenting opinion in *Diehr*.

61. Petitioner's Brief for Certiorari at 7, Diamond v. Diehr, 450 U.S. 175 (1981).

quirements of § 102. The dissenting Justices indicate that if the examiner fails to find patentable subject matter under § 101, he should never reach the question of novelty under § 102.[62] The majority opinion, in fact, does not discuss novelty requirements, but, citing *Benson* and *Flook*, finds that a claim which is otherwise drawn to statutory subject matter does not become nonstatutory simply because it involves the use of a formula or computer program.[63] The Court says that the examiner must consider a claim as a whole, not in its individual elements. "A new combination of steps in a process may be patentable even though all the constituents of the combination were well-known and in common use before the combination was made."[64] The novelty of the individual steps is irrelevant in determining whether a claim is patentable subject matter under § 101.[65] The majority does not decide, therefore, the patentability of respondents' claims, but only states that they represent patentable subject matter under § 101. The claims still may be found on remand to be unpatentable under § 102, which requires the invention to be novel, or § 103, which requires the invention to be non-obvious.[66]

The dissenting Justices apparently disagree with the idea of considering the claims as a whole, because they, in an attempt to answer the question of computer program patentability, state that if no inventive concept is disclosed elsewhere in the patent application, the computation steps are unpatentable under § 101.[67] These Justices, therefore, would require an examination of the individual elements of a claim, clearly an erroneous holding in view of decisions such as *Flook* and *Benson*.[68]

The majority, under the facts presented to it, also rejected the "preemption" doctrine as the CCPA had used it in the past.[69] According to the majority, an attempt to limit the use of a formula to

62. 450 U.S. at 211-12 (Stevens, J., dissenting).

63. *Id.* at 187.

64. *Id.* at 188.

65. *Id.* at 188-89.

66. *Id.* at 191. Confusion exists concerning whether the PTO has determined the issues of novelty and unobviousness. See *Diamond v. Diehr*, Brief for Respondents at 11-14, and compare the Reply Brief for Petitioner, at 3-4 and n.4. Depending on interpretation, the Supreme Court in reaching its decision either decided, in effect, that the patent will issue or that the matter of novelty and unobviousness still must be determined on remand to the PTO.

67. 450 U.S. at 193 (Stevens, J., dissenting).

68. *Id.* at 189, n.12.

69. *Id.* at 191-93 and note 14 therein.

a particular technological field will not transform unpatentable subject matter into patentable subject matter. A claim using a formula in a process which is otherwise patentable when considered as a whole will satisfy the requirements of § 101. The dissenting Justices agree with the rejection of the preemption theory, but they point out, contrary to statements in the majority opinion, that the post-solution activity in *Flook* was no less significant than the use of post-solution activity to open the molds in *Diehr*. In both cases this activity is a crucial part of the industrial process, but the activity cannot be used to determine patentability. To do so, according to the majority, would exalt form over substance, allowing any draftsman to claim some form of post-solution activity for any mathematical formula and produce patentable subject matter.[70]

The majority, however, appears to have done this very thing. As the dissenting Justices argue, the manner in which the majority distinguishes *Flook* is difficult to accept. Although the claims in *Flook* may not have explicitly stated the means by which one was to measure continually process variables used in the calculation there,[71] one may assume that such measurement must occur at the designated time intervals or the claimed invention is useless, and Flook would not have applied for a patent. In *Diehr*, the major distinguishing factor from *Flook* is the use of a rheometer[72] to constantly measure temperature within the molds. Such a finding seems insufficient reason to discard the earlier Court decision in *Flook* and reach the opposite result in *Diehr*.

The dissenting and majority opinions can be reconciled if one looks to the subject each addresses. Generally, the focus of the majority opinion is the construction of § 101. The dissenting opinion attempts to address two issues: (1) the patentability of computer programs, the question which the majority avoids so well, and (2) the novelty of the claims. The majority opinion's failure to consider this first question is obvious from the outset, because the Court addresses patentability of the process as a whole, not in its constituent parts.[73] In doing so, the majority has approved the CCPA practice of allowing processes which involve the use of a

70. *Id.* at 192. *But see* 450 U.S. at 212, n.36 (dissenting opinion).

71. *See* the claims as set forth in Parker v. Flook, 437 U.S. 594, 597 (1978).

72. 450 U.S. at 177-78, n.2.

73. *Id.* The Court states it is determining whether a "*process* for curing synthetic rubber which includes in several of its steps the use of a mathematical formula and a programmed digital computer is patentable subject matter under 35 U.S.C. § 101." (Emphasis added).

programmed computer to be patentable subject matter under § 101. Beyond this far-reaching[74] decision, however, the Court also has finally clarified the confusion that the earlier decision in *Flook* created. As the CCPA has recognized for nearly a decade, applying § 101 (subject matter), § 102 (novelty), and § 103 (obviousness) requires the examiner, before granting or denying a patent, to understand that each of these sections is an independent requirement which the claimed invention must meet. *Flook* hopelessly confused novelty requirements of § 102 with patentable subject matter requirements under § 101.[75] Although the majority in *Diehr* resolved the major conflicts which *Flook* and its ancestors created, the Court could not appropriately overrule *Flook* at this point because that case still presents good law, particularly the important proposition known earlier in patent law but confused by the Court itself in *Flook* and earlier cases: any new process is not unpatentable simply because it incorporates a law of nature or algorithm.[76] *Diehr* explicitly adopts this rule and requires the examiner to view the process as a whole, not in separate elements. The basis on which the majority distinguishes *Flook* is meager, yet justified when one considers the substantial clarification of the law that the decision in *Diehr* provides.

The dissenting Justices' opinion, although attempting to determine the propriety of patents on computer programs, states nothing which previous decisions have not already said. Generally, the dissent appears to perpetuate the Court's earlier confusing statements concerning program patentability under § 101. The dissenting Justices state once again, however, that such a determination is beyond the Court's constitutional authority. Because the majority failed to consider program patentability, the Court again allows Congress to decide the issue. Apparently, however, the majority and dissenting Justices do agree on one idea, though the dissent misapplies it: Sections 102 and 101 are indeed separate ele-

74. The Patent Office indicates that over 3,000 pending applications may be affected by the decision in *Diehr*. *Wall Street Journal*, March 4, 1981, at 4.

75. The *Diehr* dissenting opinion continues to misapply the novelty requirement even though the Justices clearly indicate that § 101 and § 102 should be considered separately. See note 61, *supra*, and compare the language the dissent uses. The substitution of "algorithm" for method in determining whether any inventive concept is disclosed appears to be a "cloak" for an analysis of novelty, yet the Court claims to be determining patentable subject matter under § 101. 450 U.S. at 193 (Stevens, J., dissenting).

76. *See supra* note 26.

ments which a claimed invention must satisfy before the Patent Office can issue a patent. Until now the Supreme Court did not apply that analysis in determining the patentability of a process involving the use of a computer.

Although *Diehr* answers the important question of patentability of processes involving computers and continues the Supreme Court's trend[77] of expanding the view of the patentability of various subjects, the question of patentability of computer programs is still unanswered. When one considers that computer hardware is readily patentable, the failure of the Court to recognize patentability of software, which is necessary to operate the hardware, is difficult indeed to rationalize.

The important policy underlying patents, the promotion of technology and science, and the rapidly growing technology of the present times require one to look closely at the arguments[78] for and against the patentability of computer programs.

Many argue that the complexity involved in applying for patents of computer programs would decrease the demand for patent protection for a number of reasons: First, drafting of claims would be exceedingly expensive and difficult because the patent attorney would need to describe meticulously each step of the program. Second, the delay in processing the claim may result in diminishing the value of the program, because of rapid technological advances in the field which could make the program outdated. Third, once a patent is obtained, the Patent Office makes the program available so that anyone may obtain copies. Detection of infringement would be impossible because the user simply could run the program on his own computer, store the machine language version of the program on disk or tape, and then destroy the original copy of the program. No one could interpret the machine language version and claim that it infringes the original program. Alternatively, the program could be translated into another programming language, in which case an expert could determine similarity but not identity of the two programs. The question of novelty or obviousness would be difficult to resolve in such a situation. Fourth, and perhaps most important, is the argument that the PTO is incapable of processing applications for computer program patents for two reasons:[79] (a) lack of classification technique and (b) lack of necessary search

77. *See, e.g.*, Diamond v. Chakrabarty, 447 U.S. 303 (1980).
78. These questions are reviewed extensively in Gemignani, *supra* note 18.
79. 450 U.S. at 218, n.45 (Stevens, J., dissenting).

files. The volume of material which the PTO would have to catalog would prevent adequate searches, the result being that patenting programs would amount only to a registration of them.

Countering these very strong arguments against patentability, the industry and the American Patent Law Associaton argue that since protection for hardware exists, then software, an essential for the operation of hardware, should be patentable also.[80] This presupposes, however, that the program meets other criteria for patentability. The industry further argues that the protection patents afford and the resulting usual open transfer of ideas is necessary to promote and advance the technology of the field. The present secrecy involved in the industry stifles rapid advancement, they claim, although this is difficult to believe when one considers the phenomenal growth of the software field.[81] In fact, one may question whether software developers would seek patents at all, considering the ease of infringement without detection mentioned earlier. Unfortunately, only time and experience will answer these and other questions.

CONCLUSION

The Supreme Court's decision in *Diamond v. Diehr* affirms the prior holdings of the CCPA and brings into conformity with other areas of patent law the rules applied in the case of processes involving the use of computers. First, processes involving the use of a computer are not *per se* unpatentable under § 101. Further, an examiner, when determining the issue of patentability, must look at §§ 101, 102 and 103 as separate and independent statutory requirements which must be fulfilled before an invention can be considered patentable. Finally, the examiner must view a claim as a whole and not in its elemental parts.

The majority decision subtly bypasses the issue of whether or not a computer program, in itself, is a patentable invention. Presumably, this is an indication that the Court is planning, once again, to allow Congress to decide the issue. Even so, the results of *Diehr* have far-reaching economic implications. Under *Diehr*, any process which involves the use of a computer is patentable subject matter as long as the other requirements for patentability are sat-

80. *See* Parker v. Flook, 437 U.S. 584 (1978) (*amicus curiae* brief for the Association of Data Processing Service Organizations and separate *amicus curiae* brief for American Patent Law Association).

81. *See supra* note 3; *See also*, Gemignani *supra* note 18, at 274.

isfied. If manufacturers can incorporate computers in the development of manufacturing processes, producing patentable inventions, the economic and technological benefits are obvious. This raises other interesting questions such as what degree of specificity of claims will be required to prevent infringement by later inventors? When will differences in invention be sufficient to meet the novelty and obviousness requirements of § 102 and § 103? Will a minor change in the computer program itself prevent infringement? How, if at all, will infringement be detected? These and many other questions existed before *Diehr* and today are still unanswered. Only future judicial interpretation and time will clarify these problems.

The issue, however, remains that which the Court so carefully avoided. Is computer software, absent any other patentable invention, patentable in itself? One might believe that the Supreme Court is yielding to the views and expertise of the CCPA in deciding technically complicated issues of patentability and, presuming failure of Congress to act, ultimately will exercise "judicial legislative powers", contrary to statements in past decisions, to find that software is patentable subject matter. As the Court indicates, these arguments for and against patentabilty are important and perhaps are more appropriately addressed by Congress than by the Supreme Court. One must wonder, however, how the Court in *Chakrabarty*[82] was willing to expand § 101 to incorporate patents on naturally occurring phenomena which are modified into a new and useful living organism, yet, at present, will not allow a patent on a mathematical formula or algorithm, which when modified into a computer program, yields a new and useful product. The step from *Chakrabarty* to patentability of computer programs is small indeed. If the Supreme Court is consistent in allowing an expansive view of patentable subject matter under § 101, as it did in *Chakrabarty*, and continues to follow the progressive CCPA lead, the Court will take that small step soon and determine that computer software is patentable subject matter.

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82. 447 U.S. 303 (1980).