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PATENT LAW: PATENTABILITY OF A PROCESS THAT INCLUDES A PROGRAMMED DIGITAL COMPUTER: THE COURT INVENTS A NEW STANDARD—*Diamond v. Diehr*, 101 S. Ct. 1048 (1981).

INTRODUCTION

Authority for Congress to enact the patent laws is found in the Constitution: "The Congress shall have power . . . to promote the Progress of Science and useful Arts, by securing for Limited times for Authors and Inventors the exclusive Right to their respective Writings and Discoveries."¹ The patent laws are codified in title 35 of the United States Code.

The purpose behind patents is to advance knowledge. This is done in two ways. First, patents encourage inventions by offering exclusive enjoyment of the discovery for seventeen years.² Second, patents add to the public knowledge. Patent applications disclose the discovery sufficiently to enable one skilled in the subject to duplicate the invention.³ This allows the invention to be duplicated upon expiration of the seventeen-year period. The patent system, therefore, provides only limited benefit to private individuals, primarily benefiting the public.⁴

To qualify for patent protection an invention must be patentable subject matter,⁵ new,⁶ 'useful,'⁷ and non-obvious.⁸ Until recently most

1. U.S. CONST. art. 1, § 8 cl. 8. This section was unanimously adopted without substantial debate. B. BUGBEE, GENESIS OF AMERICAN PATENT AND COPYRIGHT LAW 1-2, 125-29 (1967), 1 A. DELLER, DELLER'S WALKER ON PATENTS 74 (1973). For a discussion of common law patents and the development of the provision in the constitution see 1 A. DELLER, DELLER'S WALKER ON PATENTS 1-97 (1973).

2. During the seventeen-year period the patentee has the exclusive right to use, manufacture, and license use of the discovery. 1 A. DELLER, DELLER'S WALKER ON PATENTS 144 (1973).

3. 35 U.S.C. § 112 (1977).

4. Motion Pictures Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502, 510 (1916); Paper Bag Patent Case, 210 U.S. 405, 424 (1907); United States v. Bell Tel. Co., 167 U.S. 224, 239 (1896); Kendall v. Windsor, 62 U.S. (21 How.) 323, 327 (1858); 8 A. DELLER, DELLER'S WALKER ON PATENTS (1973). A patent that removes knowledge from the public domain is unconstitutional. Atlantic and Pac. Tea Co. v. Supermarket Corp., 340 U.S. 147, 154 (1950).

5. U.S.C. § 101 (1977). 35 U.S.C. § 101 provides "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. § 100 (1977) defines terms used in the title. Process is defined as "process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."

6. 35 U.S.C. § 102 (1977). The invention must be novel. The applicant must have invented the discovery and must not have abandoned the discovery. The discovery cannot have been previously patented in a foreign country.

7. This requirement is implicit in 35 U.S.C. § 101 (1977). *Bedford v. Hunt*, 3

litigation involved the latter three requirements; however, a number of recent cases have attempted to define statutory subject matter.⁹ The increased interest in subject matter has resulted from attempts to patent computer software¹⁰ and inventions which incorporate software.

This note will discuss *Diamond v. Diehr*,¹¹ the first United States Supreme Court decision to allow a patent on a process including a programmed digital computer.¹²

BACKGROUND

Prior to 1968 patents on computer programs were prohibited.¹³ This prohibition was based upon the mental steps doctrine which held

F. Cas. 37 (C.C.D. Mass. 1817) (No. 1217). P. ROSENBERG, PATENT LAW FUNDAMENTALS 110 (1975).

8. 35 U.S.C. § 103 (1977). A patent will be denied if "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."

9. *Parker v. Flook*, 437 U.S. 584, 588 (1978).

10. A computer is "A device capable of accepting information, applying prescribed processes to the information, and supplying the results of these processes. It usually consists of input and output devices, storage, arithmetic and logical units, and a control unit." C. SIPPL & C. SIPPL, COMPUTER DICTIONARY AND HANDBOOK 99 (1972). A program is

A plan for the automatic solution of a problem. A complete program includes plans for the transcription of data, coding for the computer, and plans for the absorption of the result into the system . . . a set of instructions or steps that tells the computer exactly how to handle a complete problem.

C. SIPPL & C. SIPPL, COMPUTER DICTIONARY AND HANDBOOK 339 (1972). Software is "The internal programs or routines professionally prepared to simplify programming and computer operations. These routines permit the programmer to use his own language (English) or mathematics (Algebra) in communicating with the computer." *Id.* at 407.

Hardware consists of tangible objects—integrated circuits, card readers, line printers, and terminals—rather than abstract ideas or instructions. How these components are constructed and how they work belong to the domain of electrical engineering. . . . Software, in contrast, consists of algorithms (detailed instructions telling how to do something) and their computer representations—namely programs. . . . The essence of software is the set of instructions that make up the programs, not the physical media on which they are recorded.

A. TANNENBAUM, STRUCTURED COMPUTER ORGANIZATION 10 (1976); H. DAVIS, *Computer Programs and Subject Matter Patentability* 6 RUT. J. COMPUTERS L. 1 (1977). In this note the terms program and software are used interchangeably.

11. 101 S. Ct. 1048 (1981).

12. A digital computer is

A computer which processes information represented by combinations of discrete or discontinuous data, as compared with an analog computer for continuous data. More specifically, it is a device for performing sequences of arithmetic and logical operations, not only on data, but also on its own program. Still more specifically, it is a stored-programmed digital computer capable of performing sequences of internally stored instructions as opposed to calculators, such as card programmed calculators, on which the sequence is impressed manually.

C. SIPPL & C. SIPPL, COMPUTER DICTIONARY AND HANDBOOK 100 (1972).

13. In 1965 the President's Commission on the Patent System advised against ex-

unpatentable any discovery that could be performed mentally as well as physically.¹⁴ In 1968 the Court of Customs and Patent Appeals (CCPA) overruled the mental steps doctrine, holding a programmed digital computer patentable.¹⁵

In *Gottschalk v. Benson*¹⁶ the Supreme Court held an algorithm¹⁷ was not patentable. The decision was based upon the principle that an idea, scientific truth, or phenomenon of nature is not patentable.¹⁸ The Court noted that a patent on the algorithm would pre-empt its use.¹⁹ The *Benson* Court quoted *Cochrane v. Denner*²⁰ in defining a patentable process,²¹ stating the “transformation and reduction of an article

tending patents to computer programs. REPORT OF THE PRESIDENT'S COMMISSION ON THE PATENT SYSTEM, “TO PROMOTE THE PROGRESS OF . . . USEFUL ARTS” IN AN AGE OF EXPLODING TECHNOLOGY, 13 (1966).

In 1966 the U.S. Patent Office issued guidelines prohibiting patents on computer programs. 829 OFF. GAZ. PAT. OFF. 865 (Aug. 16, 1966); 33 Fed. Reg. 15609 (Oct. 17, 1968).

14. In re Lundberg, 197 F.2d 336 (C.C.P.A. 1952); In re Rice, 132 F.2d 140 (C.C.P.A. 1943); Dyer v. Sound Studios of New York, 85 F.2d 431 (3rd Cir. 1936).

15. In re Prater, 415 F.2d 1378 (C.C.P.A. 1968), *modified on rehearing*, 415 F.2d 1393 (C.C.P.A. 1969). In re Bernhart, 417 F.2d 1395 (C.C.P.A. 1969). A patent was denied if it would result in the monopoly of a mathematical equation. *Id.* at 1399.

16. 409 U.S. 63 (1972). The claim was for a method of converting binary coded decimal numbers into pure binary form.

17. “A procedure for solving a given type of mathematical problem. . . .” *Id.* at 65. What the Court defined as an algorithm is generally known as a mathematical algorithm. An algorithm is generally defined as “a fixed step-by-step procedure for accomplishing a given result; usually a simplified procedure for solving a complex problem, also a full statement of a finite number of steps.” C. SIPPL & C. SIPPL, *COMPUTER DICTIONARY AND HANDBOOK*, 23 (1972). This difference has led to confusion as to the scope of the decision. In this note, algorithm, unless otherwise specified, will mean mathematical algorithm.

18. Funk Bros. Seed Co. v. Kalo Co., 333 U.S. 127 (1948); Mackay Radio and Tel. Co. v. Radio Corp. of America, 306 U.S. 86 (1939); Rubber Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498 (1874); O'Reilly v. Morse, 56 U.S. (15 How.) 62 (1853); 1 A. DELLER, *DELLER'S WALKER ON PATENTS*, 136. E. KITHER & J. LAHR, *AN INTELLECTUAL PROPERTY PRIMER* 399 (1975). In *LeRoy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1852) the Court said

A principle in the abstract, is a fundamental truth; an original cause; a motive, these cannot be patented, as no one can claim in either of them an exclusive right. . . . A patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever. This, by creating monopolies, would discourage arts and manufactures, against the avowed policy of the patent laws.

19. *Id.* at 68. O'Reilly v. Morse, 56 U.S. (15 How.) 62, 68 (1853).

20. 94 U.S. 780 (1876). *Cochrane* involved a process for grinding flour into superfine particles.

21. That a process may be patentable, irrespective of the particular form of the instrumentalities used cannot be disputed. . . . A process is a mode of treatment of certain materials to produce a given result. It is an act, or series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery.

Id. at 787-88.

'to a different state or thing' is the clue of the patentability of a process claim that does not include a particular machine."²² The Court, however, did not limit process patents to processes fitting the *Cochrane* definition.²³ Patents on computer programs were not precluded; indeed the Court made a plea to Congress to determine whether patents should extend to them.²⁴

Subsequent CCPA decisions limited *Benson* to process claims that would pre-empt an algorithm.²⁵ The addition of a post solution activity to an algorithm made the process patentable, since the algorithm would only be protected when used with that activity. Therefore pre-emption would not occur.²⁶

In contrast, the Supreme Court in *Parker v. Flook*,²⁷ denied a patent for a process even though a patent would not pre-empt an included algorithm.²⁸ The Court decided that novelty must reside in parts of the process that would be patentable by themselves and must not reside in an algorithm.²⁹ Therefore the addition of a post solution activity to an algorithm would not make that process patentable.³⁰ The Court again asked Congress to decide the issue.³¹ CCPA decisions after *Flook* failed to apply the analysis provided in *Flook*.³²

22. 409 U.S. at 70.

23. *Id.* at 71.

24. *Id.* at 71-73.

25. In re Johnston, 502 F.2d 765 (C.C.P.A. 1974), *rev'd sub nom. on other grounds*, Dann v. Johnston, 425 U.S. 291 (1976); In re Noll, 545 F.2d 141 (C.C.P.A. 1976); In re Chatfield, 545 F.2d 152 (C.C.P.A. 1976); In re Flook, 559 F.2d 21 (C.C.P.A. 1977), *rev'd sub nom. Parker v. Flook*, 437 U.S. 584 (1978); In re Freeman, 573 F.2d 1237 (C.C.P.A. 1978). In *Freeman* the court set out a two-step analysis to determine whether the subject was patentable. The claim was searched for an algorithm. If an algorithm was found and a patent would pre-empt its use the claim was unpatentable. Conversely if the algorithm would not be pre-empted if patented, the claim was patentable.

26. In re Flook, 559 F.2d 21 (C.C.P.A. 1977), *rev'd sub nom. Parker v. Flook*, 437 U.S. 584.

27. 437 U.S. 584 (1978). A method of updating alarm limits during the catalytic conversion of hydrocarbons.

28. The Court did note that a wide range of use of the algorithm would be foreclosed in the petro-chemical and oil refining industries. *Id.* at 589.

29. *Id.* at 590-92. The Court traced this analysis to Funk Bros. Seed Co. v. Kalo Co., 333 U.S. 127 (1948); Mackay Radio and Tel. Co. v. Radio Corp. of America, 306 U.S. 86 (1939); O'Reilly v. Morse, 56 U.S. (15 How.) 62 (1853); Neilson v. Harford, Webster's Patent Cases 295 (1844).

30. The Court summarized its decision by saying "[v]ery simply, our holding today is that a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101." 437 U.S. at 595 n. 18.

31. *Id.* at 595.

32. In re Johnson, 584 F.2d 1070 (C.C.P.A. 1978); In re Sarkar, 588 F.2d 1330 (C.C.P.A. 1978); In re Bergy, 596 F.2d 952 (C.C.P.A. 1979). *aff'd sub nom. Diamond v. Chakrabarty*, 100 S. Ct. 2204 (1980); In re Diehr, 602 F.2d 982 (C.C.P.A. 1979),

FACTS AND HOLDING

Cure time for synthetic rubber is calculated by the Arrhenius equation.³³ Previously the unpredictability of mold temperatures made an accurate cure difficult. Heat was lost when the mold was opened after pre-heating. The time required to reheat was unknown.³⁴ Accordingly, cure time calculations were at best an approximation, frequently resulting in under or over curing.

On August 6, 1975 James Diehr II and Theodore Lutton filed a patent application. Their discovery was a process for insuring that synthetic rubber remained in the press the exact time required to achieve a proper cure. Diehr and Lutton's invention uses a thermo-couple to measure the temperature inside the mold. The reading obtained is fed to a digital computer which continually recalculates the cure time using the Arrhenius equation. When the elapsed time the mold has been closed equals the recalculated cure time, the computer signals the mold to open.³⁵

aff'd sub nom. Diamond v. Diehr, 101 S. Ct. 1048 (1981); In re Sherwood, 613 F.2d 809 (C.C.P.A. 1980).

33. The Arrhenius equation is expressed as $\ln v = CZ + x$. In v is the natural logarithm of v , the total required cure time. C is the activation constant which is unique for each batch and is determined by rheometer measurements. A rheometer is an instrument that measures the flow of viscous substances. Z is the temperature of the mold. x is a constant that depends upon the geometry of the mold.

34. A thermostat was used that did not allow the temperature to rise beyond a certain point.

35. The Court quoted claims 1, 2, and 11 of the respondent's application.

"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 (1n),

"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

Using the *Flook* analysis, the patent examiner found the novelty of the invention resided in the use of a computer, and thus rejected the application. The Patent and Trademark Office Board of Appeals affirmed that decision. The CCPA reversed,³⁶ holding the consideration of novelty improper when compliance with § 101³⁷ is at issue.

The United States Supreme Court affirmed the decision of the CCPA, granting the patent.³⁸ The Court decided a claim including an algorithm is patentable if the process performs a function that patent laws were designed to protect.³⁹

ANALYSIS

In *Benson* and *Flook* the Court asked Congress to decide whether to allow patents for computer software and software related inven-

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,

"(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 conformance 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 throughout 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."

101 S. Ct. at 1052-53 n.3.

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

37. See note 5 *supra*.

38. 101 S. Ct. 1048 (1981).

39. *Id.* at 1059.

tions. Despite the Court's express appeals, Congress took no action. Apparently deciding nine years of Congressional inaction warranted the judiciary taking the initiative, the *Diehr* Court proceeded to address the issue itself.

At the outset of the opinion the *Diehr* Court defined statutory subject matter to "include anything under the sun that is made by man."⁴⁰ The Court noted that in dealing with the patent laws it had previously cautioned that "courts 'should not read into the patent laws limitations and conditions which a legislature has not expressed.'"⁴¹ These statements indicate a willingness to expand what is patentable, at least under § 101.

The *Diehr* Court defined process as an "act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing."⁴² The Court found *Diehr* and *Lutton*'s invention fit within this definition: "we think that a physical and chemical process for molding precision synthetic rubber products falls within the § 101 categories of possibly patentable subject matter."⁴³ After its summary determination that the application involved a process, the Court developed a new test to analyze claims under § 101. Under the *Diehr* test, a claim which includes an algorithm or mathematic formula is patentable if the discovery "implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (*e. g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101."⁴⁴ In contrast, the *Flook* Court allowed patents on software-related inventions if the invention contained novelty in an area other than the algorithm.⁴⁵

The Court's new standard, holding a discovery patentable if it performs a function the patent laws were designed to protect, may lead to difficult application and results which vary with what the particular court believes the patent laws were designed to protect. The Court

40. *Id.* at 1054, quoting the committee report to Congress when the patent laws were revised in 1952. S. REP. NO. 1979, 82d Cong., 2d Sess. 6 (1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess. 6 (1952).

41. *Id.* at 1054 (*Diamond v. Chakrabarty*, 100 S. Ct. 2204, 2207 quoting *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199). The issue in *Dubilier* was whether the federal government was entitled to the assignment of patents an employee obtained from unassigned work.

42. *Id.* at 1054-55, quoting *Cochrane v. Deener*, 94 U.S. 780, 788 (1876). The Court in *Benson* used the same definition and said "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines." 409 U.S. at 70. See text accompanying notes 20-23 *supra*.

43. *Id.* at 1055.

44. *Id.* at 1059.

45. See text accompanying note 29 *supra*.

mentioned the *Cochrane v. Deener* definition of a process as an example of what the patent laws were designed to protect.⁴⁶ Possibly the Court meant that if a claim fits within an accepted definition of a process, machine, manufacture, or composition of matter, the claim is patentable. This analysis would tie closely with the language of § 101, provide more uniformity in the patent laws, and would better reflect Congressional intent than a stricter analysis of inventions involving software.⁴⁷

The *Diehr* Court noted a process claim is patentable when all components of the process were previously known, but the combination of steps is new, useful, and nonobvious.⁴⁸ This possibility was overlooked in the *Flook* analysis, which searched for novelty in a dissected part of the claim, overlooking the possibility that there could exist a novel combination of known steps.⁴⁹ Without expressly rejecting the *Flook* analysis, the Court decided that a claim must be considered as a whole and that it is inappropriate to dissect a claim to search for its novelty under § 101. Novelty, it held, is considered only in § 102.⁵⁰ In contrast, the *Flook* Court held that a claim must be dissected for consideration, and the claim is unpatentable if the discovery's sole novelty resides in an algorithm.⁵¹

Contrary to the *Diehr* Court's interpretation, the analysis in *Flook* did not import novelty considerations into § 101. The search was not for novelty but rather for a patentable invention. The analysis insured that, to receive a patent, the inventor had to have discovered something besides an algorithm.⁵²

In reaching its decision, the *Diehr* Court confirmed the *Benson* prohibition on the patentability of an algorithm.⁵³ It held, however,

46. 101 S. Ct. at 1059.

47. There is a danger that patentability will depend upon the way the claim is drafted. Under the Court's analysis, to be patentable, a newly discovered algorithm need only be combined with a known process. The invention would be performing a function the patent laws were designed to protect and would fit within the definition of process.

48. *Eibel Process Co. v. Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923); see notes 5-8 *supra*. The Court did not decide whether *Diehr* and *Lutton*'s claims contained novelty in a component or whether novelty existed in the combination of steps. The case was not appealed on a question of novelty under § 102, and the Court held consideration of novelty inappropriate when examining the claim under § 101. See text accompanying note 50 *infra*.

49. If one were to search for a novel combination of known steps, the algorithm would have to be totally ignored. Otherwise any algorithm combined with a series of known steps would be patentable, since a novel combination would occur.

50. 101 S. Ct. at 1057-58.

51. 437 U.S. at 591-92.

52. See text accompanying notes 48 and 49 *supra*.

53. 101 S. Ct. at 1056. The prohibition extends only to mathematic algorithms.

that an application of an algorithm is patentable.⁵⁴ The Court said “Arrhenius’ equation is not patentable in isolation, but when a process for curing rubber is devised which incorporates in it a more efficient solution of the equation, that process is at the very least not barred at the threshold by § 101.”⁵⁵

The Court next distinguished *Flook*. *Flook*’s application did not disclose how the safety margin was selected, how variables were weighed and monitored, or how the alarm was set off. *Flook*’s end product, the alarm limit, was a number.⁵⁶ In contrast, *Diehr*’s end product was a cured piece of synthetic rubber. The Court said that *Flook* stood for the proposition that an algorithm cannot be patented by limiting its use to a particular technological environment or by adding a “token” or “insignificant” post-solution activity.⁵⁷ The dissent correctly pointed out that the activity of updating alarm limits is no more insignificant than determining the cure time of synthetic rubber.⁵⁸

The dissent asserted the Court misread the claim; the majority of the Court holding the claim was for a method of measuring the temperature inside the mold, and not an improved method of calculating the time the mold should be closed, as would the dissent. The dissent thought *Diehr* and *Lutton*’s claim was not for a process since it did not contain new chemistry, temperature, time periods, matter, mold design, or equipment.⁵⁹ The claim was characterized by the dissent as “. . . a method of using a digital computer to determine the amount of time that a rubber molding press should remain closed during the synthetic rubber curing process.”⁶⁰

After characterizing the claims, the dissent compared *Flook*’s claims to those of *Diehr* and *Lutton*. Both used a digital computer to repetitively recalculate a number; in *Flook* an alarm limit, in *Diehr* the

See note 17 *supra*. In arguing *Diehr*, the Patent Office defined algorithm more broadly, giving it its generally accepted meaning as a procedure for solving a problem. The Court declined to rule whether an algorithm so defined is patentable. *Id.* at 1056 n. 9.

54. *Id.* at 1057. In *Eibel Process Co. v. Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923), a patent was granted for a papermaking machine which advanced the art in utilizing gravity to improve efficiency. In *O’Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853), the Court upheld Samuel Morse’s patent on the telegraph. One claim, however, was not allowed. That claim was for a method of printing letters and signs at a distance. A patent would have foreclosed any new and improved inventions that would allow communication by printing letters from a distance.

55. *Id.* at 1057.

56. *Id.* at 1056.

57. *Id.* at 1059.

58. *Id.* at 1060 (Stevens, J., dissenting).

59. *Id.* at 1066. The dissent said nothing was unusual about the temperature-reading device.

60. *Id.* at 1067.

cure time for synthetic rubber.⁶¹ The dissent cited an article in which the claims of Diehr and Lutton were redrafted. They appeared in a format similar to those of Flook, showing the similarity between the two claims, the only difference being the way the claims were drafted.⁶²

While the processes are similar, important differences do exist between the patent applications in *Flook* and *Diehr*. Flook merely discovered a new algorithm, while Diehr and Lutton incorporated a well known formula into a process. Their invention was more than an algorithm. Under the majority's new test, however, Flook's claim would have been patentable, particularly if the claim had been redrafted.

It appears the Court made the correct decision. Diehr and Lutton's new process advances the useful arts.⁶³ The purpose of the patent laws is to increase public knowledge by encouraging inventors.⁶⁴ An increasing number of computers are being used in business and industry.⁶⁵ If the patentee has used new technology, patents should not be denied merely because the invention is a process or machine and uses an algorithm in a new, useful, and nonobvious way.

The dissent criticized the majority for not focusing upon what Diehr and Lutton claim to have discovered or "what [they] considered [their] inventive concept to be."⁶⁶ If the inventive concept resides in an

61. *Id.* at 1067.

62. An improved method of calculating the cure time of a rubber molding process utilizing a digital computer comprising the steps of:

- a. inputting into said computer input values including
 1. natural logarithm conversion data (1n),
 2. an activation energy constant (C) unique to each batch of rubber being molded,
 3. a constant (x) dependent upon the geometry of the particular mold of the press, and
 4. continuous temperature values (Z) of the mold during molding;
- b. operating said computer for
 1. counting the elapsed cure time,
 2. calculating the cure time from the input values using the Arrhenius equation $1n V = CZ + X$ where V is the total cure time, and
- c. providing output signals from said computer when said calculated cure time is equal to said elapsed cure time.

Blumenthal & Riter, *Statutory or Non-statutory?: An Analysis of the Patentability of Computer Related Inventions*, 62 J. PAT. OFF. SOC'Y. 454, 505-06. Compare this to the actual claims at note 35 *supra*.

63. Diehr and Lutton's attorney, in oral arguments before the Court, stated that the percentage of correctly cured items increased from 60 percent to nearly 100 percent after implementation of the new process.

64. See text accompanying notes 2-4 *supra*.

65. *Gottschalk v. Benson*, 409 U.S. 63, Brief for Business Equipment Manufacturers Ass'n. in support of Motion for Leave of File Brief Amicus Curiae at 6-8; 1 COMPUTER L.J. 55-58.

66. 101 S. Ct. at 1069.

algorithm, the invention would be unpatentable. This analysis would lead to confusion as to what an "inventive concept" is. Litigation over the meaning of the term would probably ensue. It is unclear how an "inventive concept" differs from novelty, if at all. It is equally unclear whether the dissent would change the analysis established by the *Flook* decision.⁶⁷

The dissent noted two areas of concern to which the majority was unresponsive.⁶⁸ First, the cases have not established rules which enable an attorney to accurately determine which program-related inventions are patentable. According to the dissent, the *Diehr* majority opinion aggravated this concern. Unlike the majority, the dissent would patent a program-related invention only if its contribution toward advancing the art is not dependent upon the use of a computer.

If the majority's test is interpreted so that a claim is patentable if it fits the definition of a process or a machine,⁶⁹ the dissent's concern is unfounded. Definitions, such as the one in *Cochrane v. Deener* transforming or reducing an item to a different state or thing,⁷⁰ provide a definite basis upon which a patent attorney can determine what is patentable.⁷¹

The second concern is that under the ambiguous definition of algorithm almost any process could be so described, thus making it unpatentable. Stating that the majority approach did not lessen this concern, the dissent would hold that the term "algorithm" is identical to the term "computer program."⁷² Because algorithms cannot be patented, this would deny patents to computer programs.

This criticism is unfounded. The dissent fails to realize that what the Court has held unpatentable are not algorithms, but mathematic algorithms. The Court has repeatedly⁷³ defined algorithm as a procedure for solving a mathematic problem.⁷⁴ Not every process can be reduced to a procedure for solving a mathematic problem. Therefore, not every process can be described as the type of algorithm that has been held unpatentable. If the generally accepted definition of

67. *Id.* at 1070.

68. *Id.* at 1072.

69. See text accompanying notes 46 and 47 *supra*.

70. See note 21 *supra*.

71. It is possible that uncertainty can arise as to the meaning of what transforming something into a different thing means. In one sense the algorithm in *Benson* that transformed numbers in binary coded decimal form into pure binary form is within *Cochrane's* definition.

72. *Id.* at 1072.

73. The Court in *Benson*, *Flook*, and *Diehr* defined algorithm in this manner.

74. See note 17 *supra*.

algorithm 'any procedure for solving a problem' was held unpatentable the dissent's concern would be valid.

CONCLUSION

The United States Supreme Court granted Diehr and Lutton's patent for a process for molding uncured synthetic rubber. After nine years of Congressional inaction the Court decided to expand the patent laws to allow patents on certain computer programs and program-related inventions.

The Court decided that a claim which includes an algorithm is patentable if the algorithm is applied in a process that performs a function the patent laws were designed to protect. Previously, under the *Flook* analysis patents on claims including an algorithm were allowed only if the invention's novelty did not reside in the algorithm.

The Court mentioned the *Cochrane v. Deener* definition of a process in its analysis. Possibly the Court meant that a claim is patentable if it fits within an accepted definition of process or machine. If so, the new analysis will better reflect the language of § 101 and will provide uniformity within § 101. Otherwise results will vary with what the particular court believes the patent laws were designed to protect. Further, the Court held dissection of a claim and consideration of novelty inappropriate under § 101.

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