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Manufacturing Process Which Includes Use of Mathematical Formula and Computer Program Constitutes Patentable Subject Matter.

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PATENT LAW—Patentable Subject Matter—Manufacturing Process Which Includes Use of Mathematical Formula and Computer Program Constitutes Patentable Subject Matter.

Diamond v. Diehr,
__U.S.__, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981).

Diehr and Lutton applied for a patent on a process for operating molding presses used in the manufacture of rubber products. The process entailed heating synthetic rubber for an exact period of time in a mold. The constant temperature inside the mold was measured and fed into a computer which repeatedly calculated the cure time by use of a mathematical equation.[1] When the mold had been heated long enough, according to the equation, the computer signaled the press to open automatically. The patent examiner rejected the patent claims as non-patentable subject matter under title 35, section 101 of the United States Code.[2] The United States Patent & Trademark Office Board of Appeals affirmed the examiner's opinion.[3] The United States Court of Customs and Patent Appeals, however, reversed.[4] The United States Supreme Court granted certiorari.[5]

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1. *See* Diamond v. Diehr, __U.S.__, __, 101 S. Ct. 1048, 1052-53 n.5, 67 L. Ed. 2d 155, 161 n.5 (1981). Variables in the formula included the geometric shape of the mold, the constant temperature of the mold during molding, and the type of compound heated. *See id.* at __, 101 S. Ct. at 1051-52, 67 L. Ed. 2d at 160. The inventors claimed their process ensured a perfect cure, something the rest of the industry had not been able to uniformly achieve. *See id.* at __, 101 S. Ct. at 1052 n.3, 67 L. Ed. 2d at 160 n.3. A digital computer works with information that is in digital or character form, including alphabetic and other symbols as well as numbers. *See generally* M. WEIK, STANDARD DICTIONARY OF COMPUTERS AND INFORMATION PROCESSING 81 (1970).

> Numbers in a digital computer are represented as space-time distributions in media such as punched-holes, . . . [and] magnetized spots in a surface of tapes, ... The typical digital computer is the internally stored program, electronic type that can store instructions calling for the execution of sequences of operations, execute these instructions, and modify them according to the results obtained, as well as store and utilize the data to be operated upon.

Id. at 81. This differs from an analog computer which "measures values, like an ordinary voltmeter . . . ." *See id.* at 80.

2. *See* Diamond v. Diehr, __U.S.__, __, 101 S. Ct. 1048, 1052-53, 67 L. Ed. 2d 155, 161-62 (1981); 35 U.S.C. § 101 (1976).

3. *See* Diamond v. Diehr, __U.S.__, __, 101 S. Ct. 1048, 1053, 67 L. Ed. 2d 155, 162 (1981).

4. *See In re* Diehr, 602 F.2d 982, 989 (C.C.P.A. 1979).

5. *See* Diamond v. Diehr, __U.S.__, __, 101 S. Ct. 1048, 1059, 67 L. Ed. 2d 155, 169 (1981).

Held—*Affirmed.* A manufacturing process which includes the use of a mathematical formula and a computer program constitutes patentable subject matter.

The patent is a form of trade protection which allows protection for the final product, as well as the underlying basis upon which it is developed.[6] Several criteria must be satisfied in order to obtain a patent on an invention.[7] Initially, the claimed subject matter must fall within a statutory category.[8] Under title 35, section 101 of the United States Code, patents may only be sought for a process, a manufacture, a machine, or a composition of matter.[9] The claimed subject matter must also meet additional conditions of patentability, such as utility,[10] novelty,[11] non-obviousness,[12]

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6. *See* 35 U.S.C. § 154 (1976) (patentee receives 17 year monopoly and "right to exclude others from making, using, or selling the invention"). The patent offers more protection to the inventor than the copyright, which does not protect the idea or techniques of development. *See* Mazer v. Stein, 347 U.S. 201, 217 (1954); Baker v. Selden, 101 U.S. 99, 103 (1879). *See generally* P. ROSENBERG, PATENT LAW FUNDAMENTALS II-1 (2d ed. 1980) (comparison of trade secrets, copyrights, with patents).

7. *See, e.g.,* 35 U.S.C. § 101 (1976) (claims must define statutory subject matter); *id.* § 102 (invention must be new); *id.* § 103 (invention must be non-obvious to one skilled in art); *id.* § 112 (claims must specifically disclose invention).

8. *See* Kewanee Oil v. Bicron Corp., 416 U.S. 470, 476-77 (1974); 35 U.S.C. § 101 (1976). Section 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. § 101 (1976). The language of this statute is derived from the Patent Act of 1793, which has remained intact except for the substitution of the word "process" for "art." *See* S. REP. No. 1979, 82d Cong., 2d Sess. 5, *reprinted in* [1952] U.S. CODE CONG. & AD. NEWS 2394, 2396-2399.

9. *See* 35 U.S.C. § 101 (1976). A process includes the transformation or reduction of literal substances or things. *See* Cochrane v. Deener, 94 U.S. 780, 787-88 (1876). A process patent, however, does not require that the machine used in carrying out the process be new or patentable. *See id.* at 788. Title 35, section 100(b) of the United States Code defines process as "process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C. § 100(b)(1976). The term "manufacture" is defined as "the production of articles for use from raw materials prepared by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." *See* American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11 (1931) (immersing fruit in solution to render it resistant to mold decay not manufacture). The term "machine" includes "every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." Corning v. Burden, 56 U.S. (15 How.) 252, 267 (1853) (machine for rolling masses of iron into balls). "Composition of matter" has been construed to include "all compositions of two or more substances and . . . all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders, or solids." Shell Dev. Co. v. Watson, 149 F.Supp. 279, 280 (D.D.C. 1957); 1 A. DELLER, WALKER ON PATENTS § 14, at 55 (1st ed. 1937).

10. *See* Cusano v. Kotler, 159 F.2d 159, 162 (3d Cir. 1947) (patent on game board granted as useful); 35 U.S.C. §§ 101, 112 (1976). Utility means an invention must perform

and adequate disclosure.[13] Although each of these conditions are important in determining whether an invention deserves patent protection, the novelty requirement lies at the core of the patent system.[14] Section 101 requires the subject matter to be "new,"[15] while the section 102 novelty

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some function of positive benefit to society. *See* Brenner v. Manson, 383 U.S. 519, 534-35 (1966) (chemical process for making certain steroids not useful). The concept of utility has been derived from the term "useful" as used in the language of section 101 and the section 112 requirement that a patent application teach a person with ordinary skill in the art how "to make and use" the invention. *See* 35 U.S.C. §§ 101, 112 (1976). *See generally* Note, *The Utility Requirement In The Patent Law*, 53 GEO. L.J. 154, 156 (1964).

11. *See* 35 U.S.C. § 102 (1976). Novelty or newness is the *sine qua non* of every invention. *See* Nickola v. Peterson, 410 F.Supp. 590, 593 (E.D. Mich. 1976), *aff'd*, 580 F.2d 898 (6th Cir. 1978), *cert. denied*, 440 U.S. 961 (1979). To be entitled to patent protection one must be the first inventor. *See* FMC Corp. v. F.E. Myers & Bro. Co., 384 F.2d 4, 9 (6th Cir. 1967). Determinations of novelty are made in light of the prior art, which is that fund of information available or accessible to the public. *See In re* Bergy, 596 F.2d 952, 962 (C.C.P.A. 1979) (novelty involves comparison with prior art); 35 U.S.C. § 102(a) (1976) (no patent issues if invention known or used by others).

12. *See* 35 U.S.C. § 103 (1976). The statute reads in pertinent part: "A patent may not be obtained . . . 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 . . . . *Id.* The Supreme Court has held that a patent for a new product could not be upheld if its construction required no more than the "skill . . . possessed by an ordinary mechanic acquainted with the business." Hotchkiss v. Greenwood, 52 U.S. (11 How.) 248, 267 (1850). The Court has also established three steps to be followed in dealing with this issue: first, the scope and content of the prior art is to be determined; second, the difference between the prior art and the claims in issue is to be determined; and third, the level of skill of persons trained in the art at the time of the invention is to be determined. *See* Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966). *See also* Anderson's-Black Rock v. Pavement Salvage Co., 396 U.S. 57, 61-62 (1969) (method of paving obvious).

13. *See* Aro Mfg. Co., Inc. v. Convertible Top Replacement Co., Inc., 365 U.S. 336, 358 (1961); 35 U.S.C. § 112 (1976). The inventor must file an application which includes specifications, claims, and a drawing. *See* 35 U.S.C. § 112 (1976) (applicants must define with particularity the subject matter which is regarded to be invention). *See also* Purdue Research Foundation v. Watson, 265 F.2d 107, 107 (D.C. Cir. 1959) (patent claims must define invention). Under section 112, the inventor must adequately set forth and describe three items: the invention, the manner and process of making and using the invention, and the best mode contemplated by the inventor of carrying out his invention. *See* 35 U.S.C. § 112 (1976).

14. *See* Nickola v. Peterson, 410 F.Supp. 590, 593 (E.D. Mich. 1976) ("to be patentable, any claimed invention must satisfy the requirement of 'novelty' . . . "), *aff'd*, 580 F.2d 898 (6th Cir. 1978), *cert. denied*, 440 U.S. 961 (1979). *See also In re* Bergy, 596 F.2d 952, 961-64 (C.C.P.A. 1979) (invention which is statutory but not novel is unpatentable).

15. *See* 35 U.S.C. § 101 (1976). Section 101 provides three main requirements of patentability: novelty, utility, and statutory subject matter. *See id.* § 101. "That these three requirements are separate and distinct" however, "is long-standing and has been universally accepted." *In re* Bergy, 596 F.2d 952, 960 (C.C.P.A. 1979).

requirement defines "new" by negative implication.[16] The question of the invention's newness, however, is not dispositive of whether it constitutes patentable subject matter under section 101.[17] Only if a patent claim is patentable subject matter according to section 101, will the test of novelty under section 102 be applied.[18] Outside the realm of patent protection are ideas,[19] scientific principles,[20] phenomena of nature,[21] mental processes or steps,[22] and mathematical equations or formulas.[23]

Relying on the "mental steps" doctrine under section 101,[24] the Patent

16. *See* 35 U.S.C. § 102 (1976) (seven factors which defeat claim of novelty).

17. *See In re* Bergy, 596 F.2d 960-61 (C.C.P.A. 1979) (question of invention's novelty unrelated to whether the invention falls into a category of statutory subject matter); Reeves Instrument Corp. v. Beckman Instruments, Inc., 444 F.2d 263, 270 (9th Cir. 1971) ("no warrant exists for looking to word 'new' in § 101 for understanding or application of the novelty requirement").

18. *See* Parker v. Flook, 437 U.S. 584, 593 (1978). The Supreme Court has directed that a determination that statutory subject matter under section 101 exists precede the inquiries under sections 102 and 103. *See id.* at 593. *Accord, In re* Bergy, 596 F.2d 952, 961-64 (C.C.P.A. 1979).

19. *See, e.g.*, Patent Clothing Co. v. Glover, 141 U.S. 560, 564 (1891) (bridging strip of cloth across fly of pantoloons to reinforce against tearing); Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874) (placing rubber eraser on end of pencil); Wyeth v. Stone, 30 F.Cas. 723, 724 (C.C.D. Mass. 1840) (No. 18,107) (cutting ice to uniform size).

20. *See, e.g.*, Diamond v. Chakrabarty, 447 U.S. 303, 315 (1980) (theory of relativity ($E=mc^2$) would not have been patentable); O'Reilly v. Morse, 56 U.S. (15 How.) 62, 112-13 (1853) (claims directed at electro-magnetism); Morton v. New York Eye Infirmary, 17 F.Cas. 879, 882-883 (S.D.N.Y. 1862) (No. 9865) (use of ether as surgical anesthesia not patentable).

21. *See, e.g.*, Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 131 (1948) (inoculants of bacteria); General Elec. Co. v. DeForest Radio Co., 28 F.2d 641, 645 (3d Cir. 1928) (tungsten); *In re* Marden, 47 F.2d 957, 958 (C.C.P.A. 1931) (use of uranium). *But see* Diamond v. Chakrabarty, 447 U.S. 303, 318 (1980) (genetically-altered microorganism constitutes patentable subject matter).

22. *See, e.g., In re* Abrams, 188 F.2d 165, 168-70 (C.C.P.A. 1951) (petroleum prospecting method by use of echoes); *In re* Heritage, 150 F.2d 554, 556-58 (C.C.P.A. 1945) (mental steps unpatentable); *Ex parte* Meinhardt, 1907 Dec. Com. Pat. 237, 238 (system for spacing free-hand letters).

23. *See, e.g.*, Gottschalk v. Benson, 409 U.S. 63, 65-66 (1972) (method for converting binary-coded decimal numerals into pure binary numerals); *In re* Walter, 618 F.2d 758, 769 (C.C.P.A. 1980) (claims not patentable if "no substance apart from the calculations involved"); *In re* Christensen, 478 F.2d 1392, 1392-93 (C.C.P.A. 1973) (mathematical equation for computing porosity of sub-surface formations). The rationale of these limitations on patentability is to prevent the pre-emption of entire fields of science and the establishment of a monopoly on human thought. *See* MacKay v. Radio Corp., 306 U.S. 86, 94 (1939). The Court in *MacKay* stated: "While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be." *Id.* at 94. *See* Le Roy v. Tatham, 55 U.S. (14 How.) 156, 174-75 (1852) (no one can claim exclusive right in principle). *See generally* D. CHISUM, PATENTS § 1.03(2), at 1-43 (1981) (discussion of rules concerning patentability of principles).

24. *See* Halliburton Oil Well Cementing Co. v. Walker, 146 F.2d 817, 821-22 (9th Cir.

Office routinely denied patents on computer programs or software.[25] If a patent application described a process that could be performed entirely mentally, or with the aid of pencil and paper, it was rejected because a monopoly could not be granted for a cogitative process.[26] Similarly, a process which amounted to nothing more than a description of the function of a machine was held unpatentable.[27] In addition, several policy considerations were used to support the denial of computer program patentability including administrative convenience, the difficulty in making an adequate patent search, and the availability of other forms of trade protection.[28] Moreover, the approach of the Patent Office had the support of the computer hardware industry.[29]

1944), *rev'd on other grounds*, 329 U.S. 1 (1946). A mental step or act is one which may be performed by the human mind without the intervention of physical instrumentalities. *See generally* McClaskey, *The Mental Process Doctrine: Its Origin, Legal Basis, and Scope*, 55 IOWA L. REV. 1148, 1169 (1970); D. CHISUM, PATENTS § 1.03(6)[a], at 1-59 (1978).

25. *See, e.g., In re* Abrams, 188 F.2d 165, 168-70 (C.C.P.A. 1951) (method for petroleum prospecting through echoes); *In re* Yuan, 188 F.2d 377, 383 (C.C.P.A. 1951) (mathematical procedure for construction of airfoil); *In re* Bolongaro, 62 F.2d 1059, 1060 (C.C.P.A. 1933) (method of producing printed publication from manuscripts). The status of statutory subject matter was denied to certain methods or processes; either because they could be completely performed by a human, or they required the use of the human intellect for their performance. *See In re* Cooper, 134 F.2d 630, 631-32 (C.C.P.A. 1943) (mathematical formula relating to producing steel); Don Lee, Inc. v. Walker, 61 F.2d 58, 67 (9th Cir. 1932) (method of counterbalancing engine main shaft not patentable). *See generally* McClaskey, *The Mental Process Doctrine: Its Origin, Legal Basis, and Scope*, 55 IOWA L. REV. 1148, 1162 (1970). In 1968, the Patent Office adopted a set of guidelines for patent examiners which stated, "computer programming *per se*, whether defined in the form of process or apparatus shall not be patentable." 33 Fed. Reg. 15609 (1968). "Software" is defined as computer programs. *See* Parker v. Flook, 437 U.S. 584, 587 n.7 (1978). "Hardware" consists of the general physical machinery of the computer such as printed circuit boards, cables, power supplies, memories, card readers, line printers, and terminals. *See generally* M. WEIK, STANDARD DICTIONARY OF COMPUTERS AND INFORMATION PROCESSING 152 (1970).

26. *See In re* Abrams, 188 F.2d 165, 168-70 (C.C.P.A. 1951); *In re* Cooper, 134 F.2d 630, 631-32 (C.C.P.A. 1943).

27. *See* Corning v. Burden, 56 U.S. (15 How.) 252, 268 (1853). The "function of a machine" doctrine is generally traced to the *Corning* decision, in which the Court stated it was well settled that "a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it." *Id.* at 268. *See, e.g.*, Expanded Metal Co. v. Bradford, 214 U.S. 366, 383 (1909) (mere function of machine not patentable); Busch v. Jones, 184 U.S. 598, 607 (1902) (operation and effect of machine not patentable); Westinghouse v. Boyden Power Brake Co., 170 U.S. 537, 554-57 (1898) (mere function of a machine cannot be patented).

28. *See* PRESIDENT'S COMM. ON THE PATENT SYSTEM, REPORT ON PATENT LAW 13 (1966). The Commission noted that, without patent protection, the software industry had expanded satisfactorily. *See id.* at 15. Although trade secret and copyright protection are sometimes used in the software field, they are of only limited value. *See generally* Note, *Adequate Legal Protection For Computer Programs*, 1968 UTAH L. REV. 369, 376.

29. *See* D. BENDER, COMPUTER LAW: EVIDENCE AND PROCEDURE § 1.03 (1980). The

Beginning in 1968, United States Court of Customs and Patent Appeals (CCPA) decisions determined that computer programs could come within the category of statutory subject matter.[30] The CCPA decided that patent protection for a computer program should not be foreclosed merely because the process may be performed mentally, if the steps of the claimed process could also be accomplished without any element of mental operation.[31] The CCPA also rejected the principle that claims in a patent application may be dissected into old and new elements and thereby, defeat an entire computer program claim simply because a portion of the claim is unstatutory.[32]

The United States Supreme Court has, on two occasions, specifically addressed the issue of whether computer programs constituted patentable subject matter under section 101.[33] In *Gottschalk v. Benson*,[34] the Court rejected claims for a patent on software because a patent would give the claimant a monopoly on a mathematical formula.[35] The Court in *Parker*

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hardware firms opposed patentability for computer programs as a process because it would severely limit the free use of their computers. It was standard practice for hardware manufacturers to supply free software with hardware, as a total package for customers. *See generally* Note, *Computer Software: Beyond The Limits of Existing Proprietary Protection Policy*, 40 BROOKLYN L. REV. 116, 127 n.82 (1973).

30. *See, e.g., In re* Waldbaum, 457 F.2d 997, 1003 (C.C.P.A. 1972) (analysis of data words in computer-controlled system patentable); *In re* McIlroy, 442 F.2d 1397, 1398 (C.C.P.A. 1971) (machine implementation versus mental implementation not dispositive in defining statutory subject matter); *In re* Mahony, 421 F.2d 742, 746-47 (C.C.P.A. 1970) (automatic synchronization by computer program, of receiver of digital information patentable).

31. *See In re* Prater, 415 F.2d 1378, 1389 (C.C.P.A. 1968), *modified*, 415 F.2d 1393 (C.C.P.A. 1969). The court stated that the Supreme Court's discussion of "process" in *Cochrane v. Deener* had not been intended to limit process claims to operations on physical processes, but rather meant a process is not limited to the particular physical apparatus or machine used in performing it. *See In re* Prater, 415 F.2d 1378, 1388-89 (C.C.P.A. 1968), *modified*, 415 F.2d 1393 (C.C.P.A. 1969). *See also* Cochrane v. Deener, 94 U.S. 780, 787-88 (1876). The CCPA also overruled the "function of a machine" doctrine. *See In re* Tarczy-Hornoch, 397 F.2d 856, 867 (C.C.P.A. 1968).

32. *See In re* Chatfield, 545 F.2d 152, 158 (C.C.P.A. 1976). The CCPA stated that they rejected "the broad notion that if a portion of a claim be non-statutory the whole claim is *ipso facto* non-statutory." *Id.* at 158. *See also In re* Bernhart, 417 F.2d 1395, 1399 (C.C.P.A. 1969).

33. *See* Parker v. Flook, 437 U.S. 584, 588 (1978) ("case turns entirely on the proper construction of § 101 of the Patent Act "); Gottschalk v. Benson, 409 U.S. 63, 64 (1972) ("issue is whether the method described and claimed is a 'process' " under section 101).

34. 409 U.S. 63 (1972).

35. *See id.* at 71-72. The Court found that the mathematical formula could be performed without a computer; therefore, the grant of a patent would remove the formula from the public domain. *See id.* at 67. *See generally* Note, *Computer Software: Beyond The Limits of Existing Proprietary Protection Policy*, 40 BROOKLYN L. REV. 116, 123 (1973); Note, *Patentability: Piecing Together The Computer Software Patent Puzzle*, 19 ST. LOUIS

v. Flook[36] was confronted with the patentability of a process which included the use of a computer program and a mathematical formula for updating alarm limits in a petroleum refining process.[37] Relying on *Benson* and two previous decisions dealing with subject matter patentability,[38] the *Flook* Court found the claims did not define statutory subject matter.[39] The claims in *Flook* were drawn to a method for computing the alarm limit.[40] Since an alarm limit is simply a number, the Supreme Court concluded that the application sought only to protect a formula for computing this number.[41]

In *Diamond v. Diehr*,[42] the United States Supreme Court addressed the issue of whether a patent claim for a process of molding rubber products utilizing a mathematical equation and a computer program defined statutory subject matter under title 35, section 101 of the United States Code.[43] The majority reaffirmed the principle that a mathematical

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U. L. J. 351, 369 (1975).

36. 437 U.S. 584 (1978).

37. *See id.* at 585. When the variables of the formula exceeded a pre-set alarm limit, an alarm would signal if an unusual condition or danger were present. *See id.* at 585. The CCPA had reversed the Patent & Trademark Office Board of Appeals, finding that *Benson* applied only to claims which entirely pre-empted a mathematical formula or algorithm, and not those which limited its use in conjunction with a claimed process. *See In re* Flook, 559 F.2d 21, 22-23 (C.C.P.A. 1977).

38. *See* Gottschalk v. Benson, 409 U.S. 63, 65 (1972) (mathematical formula non-patentable); Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948) (invention from scientific principle must come from application of same to new and useful end); MacKay Radio & Tele. Co. v. Radio Corp., 306 U.S. 86, 94 (1939) (wire arrangement in directional antenna system determined by application and calculation of mathematical formula). The *Benson* Court had defined "algorithm" as a procedure for solving a given type of mathematical problem. *See* Gottschalk v. Benson, 409 U.S. 63, 65 (1972). By analogizing algorithm with computer programs, the *Benson* Court was able to rely on that body of law declaring ideas or mathematical formulas to be unpatentable. *See id.* at 67; Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874).

39. *See* Parker v. Flook, 437 U.S. 584, 591 (1978). The majority analyzed the claims under section 101 on the premise that the mathematical equation was a familiar part of the prior art. *See id.* at 591. *But cf. In re* Chatfield, 545 F.2d 152, 158 (C.C.P.A. 1976) (invention which reassigned priorities of programming in multiprogram competing system not part of prior art). The CCPA had previously rejected the notion "that a claim may be dissected, the claim components searched in the prior art, and if the only component found novel is outside the statutory classes of invention, the claim may be rejected under 35 U.S.C. § 101." *In re* Chatfield, 545 F.2d 152, 158 (C.C.P.A. 1976). For CCPA criticism of *Flook*, see *In re* Bergy, 596 F.2d 952, 964-65 (C.C.P.A. 1979) and *In re* Sarkar, 588 F.2d 1330, 1333 (C.C.P.A. 1978).

40. *See* Parker v. Flook, 437 U.S. 584, 585 (1978).

41. *See id.* at 585, 586.

42. ___U.S.___, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981).

43. *See id.* at ___, 101 S. Ct. at 1051, 67 L. Ed. 2d at 160.

formula in isolation is non-patentable subject matter,[44] but determined Diehr and Lutton claimed a "process" incorporating an equation and a computer program.[45] The Court concluded that the industrial process for molding precision rubber products is the type of process the patent laws were designed to protect.[46] Moreover, the *Diehr* Court decided a process which is otherwise statutory, does not become non-statutory merely because a mathematical equation and a computer program are involved.[47] The majority distinguished *Flook*, finding that the claimants in the instant case did not seek to pre-empt a mathematical equation, but sought only to foreclose others from its use in conjunction with the other steps of the claimed process.[48] The *Diehr* Court, therefore, sustained the patent claims as defining statutory subject matter under section 101.[49]

The four dissenting Justices argued the facts in *Diehr* were not distinguishable from those in *Flook*.[50] The dissent contended the majority had misread what Diehr and Lutton claimed to have invented, asserting the claims were merely an improved method for calculating the time the mold should stay closed during the curing process.[51] According to the dissent, the question of computer program patentability involves policy considerations which should be resolved by Congress.[52] The dissent also concluded that the patent application made no contribution to the prior art because the process of molding rubber was not new.[53]

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44. *See id.* at ___, 101 S. Ct. at 1056, 67 L. Ed. 2d at 165; Gottschalk v. Benson, 409 U.S. 63, 65 (1972).

45. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1056, 67 L.Ed.2d 155, 166 (1981).

46. *See id.* at ___, 101 S. Ct. at 1055, 67 L. Ed. 2d at 164. The Court restated the definition of "process", first enunciated in Cochrane v. Deener, 94 U.S. 780, 787-88 (1876) and followed in Gottschalk v. Benson, 409 U.S. 63, 69-70 (1972), as a method or means of producing a certain result or effect. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1054-55, 67 L. Ed. 2d 155, 163-64 (1981).

47. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1056, 67 L. Ed. 2d 155, 166 (1981).

48. *See id.* at ___, 101 S. Ct. at 1056, 67 L. Ed. 2d at 166; *cf.* Parker v. Flook, 437 U.S. 584, 589-90 (1978) (claimant sought partial pre-emption of mathematical formula).

49. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1059, 67 L. Ed. 2d 155, 169 (1981).

50. *See id.* at ___, 101 S. Ct. at 1067-69, 67 L. Ed. 2d at 179-81 (Stevens, Brennan, Marshall, Blackmun, J. J., dissenting).

51. *See id.* at ___, 101 S. Ct. at 1066, 67 L. Ed. 2d at 177-78 (Stevens, J., dissenting).

52. *See id.* at ___, 101 S. Ct. at 1071-72, 67 L. Ed. 2d at 183-84 (Stevens, J., dissenting). In support of this proposition, the dissent cited *Benson* and *Flook*, and stated: "The cases considering the patentability of program-related inventions do not establish rules that enable a conscientious patent lawyer to determine with a fair degree of accuracy which, if any, program-related inventions will be patentable." *Id.* at ___, 101 S. Ct. at 1072, 67 L. Ed. 2d at 185 (Stevens, J., dissenting).

53. *See id.* at ___, 101 S. Ct. at 1066, 67 L. Ed. 2d at 177 (Stevens, J., dissenting). The

The *Diehr* Court's holding is entirely consistent with title 35, section 101 subject matter standards.[54] Although both the majority and dissent acknowledged that *Diehr* presented a section 101 statutory subject matter question,[55] the dissent improperly injected considerations of section 102 novelty into its analysis.[56] The majority in *Flook* employed the same rationale.[57] The section 101 requirement of statutory subject matter and the section 102 novelty standard are distinct because the determination that an invention constitutes statutory subject matter under section 101 precedes the determination of whether the invention is novel under section 102[58] In light of *Diehr*, the claimed invention in *Flook* would have defined statutory subject matter in accordance with section 101.[59] Both processes involved an initial calculation by means of a mathematical formula, con-

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dissent relied on the Goodyear patent case, Tilghman v. Proctor, 102 U.S. 707, 722 (1880) which scrutinized the process of vulcanizing rubber, to support the proposition that the process of curing rubber is not new or novel. *See id.* at ___, 101 S. Ct. at 1066 n.25, 67 L. Ed. 2d at 177 n.25 (Stevens, J., dissenting).

54. *Compare id.* at ___, 101 S. Ct at 1059, 67 L. Ed. 2d at 169 (improved process for molding rubber articles patentable) *with* 35 U.S.C. § 101 (1976) (improvements of processes patentable).

55. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1057-58, 67 L. Ed. 2d 155, 167-68 (1981); *id.* at ___, 101 S. Ct. at 1060, 67 L. Ed. 2d at 170 (Stevens, J., dissenting). The section 101 statutory subject matter issue was the only issue before the Court, although a patent claim must also satisfy the section 101 novelty requisite. *See* 35 U.S.C. §§ 101, 102 (1976).

56. *Compare* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1066-67, 67 L. Ed. 2d 155, 177-78 (1981) (Stevens, J., dissenting) (considered lack of novelty of rubber curing process) *with id.* at ___, 101 S. Ct. at 1057, 67 L. Ed. 2d at 167-68 (majority stated novelty is inappropriate consideration under § 101). The dissent's co-mingling of the two issues stems from the language in section 101 referring to any "new and useful" process, machine, etc. *See* 35 U.S.C. § 101 (1976). As the majority noted: "[S]ection 101 . . . is a general statement of the type of subject matter that is eligible for patent protection . . . . Specific conditions for patentability follow and section 102 covers in detail the conditions relating to novelty." *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1057-58, 67 L. Ed. 2d 155, 167 (1981).

57. *Compare* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1066-67, 67 L. Ed. 2d 155, 177 (1981) (Stevens, J., dissenting) ("Diehr and Lutton do not claim to have discovered anything new about the process for curing synthetic rubber") *with* Parker v. Flook, 437 U.S. 584, 591 (1978) ("process itself, . . . must be new and useful").

58. *See* Parker v. Flook, 437 U.S. 584, 593-94 (1978) (inquiry must come first under § 101 before determinations of §§ 102-103); *In re* Bergy, 596 F.2d 952, 960 (C.C.P.A. 1979) (§ 101 determinations wholly apart from § 102 inquiries). "The obligation to determine what type of discovery is sought to be patented must precede the determination of whether that discovery is, in fact, new or obvious." *See* Parker v. Flook, 437 U.S. 584, 593 (1978).

59. *Compare* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1058-59, 67 L. Ed. 2d 155, 168-69 (1981) (manufacturing process which includes use of mathematical equation and computer program constitutes statutory subject matter under § 101) *with* Parker v. Flook, 437 U.S. 584, 594-95 (1978) (refining process which includes use of mathematical formula and computer program non-patentable subject matter under § 101).

tinual remeasurement and recalculation of variables such as temperature and time by means of a computer program, and some use of the value obtained from the calculation.[60] In *Diehr*, the "use" was a signal to the molding press to open automatically; in *Flook* the "use" was a signal to terminate or modify the refining process when the calculation reached a pre-set alarm limit.[61] The Court, therefore, has limited patent claim analysis under section 101 to only those factors incident to the determination of statutory subject matter, excluding considerations of novelty relied upon by the majority in *Flook* and the dissent in *Diehr*.[62]

Diehr demonstrates a significant exercise of judicial review in light of the Court's caution in previous opinions.[63] The Supreme Court, nevertheless, correctly interpreted the broad statutory language of the Patent Act in light of a new technological development.[64] The four classes of statutory subject matter under section 101 have been reinterpreted to cover most of the new technologies that evolved during the last century and a half such as the telegraph, telephone, electric lamp, airplane, transistor, neutronic reactor, and the laser.[65] It is unclear, however, whether *Diehr*

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60. *Compare* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1052 n.5, 67 L. Ed. 2d 155, 161 n.5 (1981) *with* Parker v. Flook, 437 U.S. 584, 585 (1978).

61. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1052, 67 L. Ed. 2d 155, 161 (1981); Parker v. Flook, 437 U.S. 584, 585 (1978).

62. *See* Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1057-58, 67 L. Ed. 2d 155, 167-68 (1981) ("novelty . . . of no relevance in determining whether . . . subject matter of a claim falls within . . . § 101").

63. *Compare id.* at ___, 101 S. Ct. at 1059, 67 L. Ed. 2d at 168 (Congress intended statutory subject matter to "include anything under the sun that is made by man") *with* Parker v. Flook, 437 U.S. 584, 595-96 (1978) ("[w]e must proceed cautiously when . . . asked to extend patent rights into areas . . . unforeseen by Congress") *and* Gottschalk v. Benson, 409 U.S. 63, 73 (1972) ("if these programs are . . . patentable, considerable problems are raised which only committees of Congress can manage").

64. *See* Diamond v. Chakrabarty, 447 U.S. 303, 307-308 (1980) (language of Patent Act must be given broad construction to foster productive efforts). *See also*, Diamond v. Diehr, ___U.S.___, ___, 101 S. Ct. 1048, 1054, 67 L. Ed. 2d 155, 163 (1981) ("a process has historically enjoyed patent protection"). In upholding the patent claim before it, the *Chakrabarty* Court stated:

> It is, of course, correct that Congress, not the courts, must define the limits of patentability; but it is equally true that once Congress has spoken it is 'the province and duty of the judicial department to say what the law is.' Congress has performed its constitutional role in defining patentable subject matter in section 101; we perform ours in construing the language Congress has employed . . . . The subject matter provisions of the patent law have been cast in broad terms to fulfill the constitutional and statutory goal of promoting 'the progress of science and the useful arts' with all that means for the social and economic benefits envisioned by Jefferson.

Id. at 315 (citation omitted); *See* The Telephone Cases, 126 U.S. 1, 534 (1888) (patent on the Bell telephone); O'Reilly v. Morse, 56 U.S. (15 How.) 62, 121 (1853) (Morse patent on the telegraph).

65. *See, e.g.*, The Incandescent Lamp Patent, 159 U.S. 465, 472-73 (1895) (Edison's

will have a significant effect on the computer industry. The Patent Office and some commentators predicted a flood of patent applications should patentability be extended to computer programs.[66] In the immediate aftermath of *Diehr*, this prediction appears to be exaggerated.[67]

Diehr is yet another example of the Court's recognition of an important technological development, and its potential benefit to industry and society. The decision clarifies the body of law concerning section 101 subject matter standards by eliminating considerations of section 102 novelty from the determination of patentable subject matter under section 101. Although the *Diehr* Court did not expressly proclaim the patentability of computer programs, it has made, by extending the language of the Patent Act, the advantages of patentability available to unique software and other similar technologies developed in the future.

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electric lamp); Gould v. Schawlow & Townes, 363 F.2d 908, 909 (C.C.P.A. 1966) (invention of laser); *In re* Seaborg, 328 F.2d 996, 996 (C.C.P.A. 1964) (method of achieving nuclear reaction in a neutronic reactor).

66. *See, e.g.*, Gemignani, *Legal Protection For Computer Software: The View From '79*, 7 RUTGERS J. COMP., TECH. & LAW 269, 310 (1980) (software protection would lead to proliferation of administrative problems); Keeffe, *Protecting Software: Is It Worth All The Trouble?*, 62 A.B.A.J. 906, 907 (1976) (congressional inaction in extending protection may be implicit recognition of administrative problem); PRESIDENT'S COMM. ON THE PATENT SYSTEM, REPORT ON PATENT LAW 13 (1966) (Patent Office could not effectively process the flood of applications which would inevitably flow).

67. Telephone interview with Isacc Fleishman, Director of Information Services, United States Patent and Trademark Office, in Washington, D.C. (July 30, 1981). Patent and Trademark Office officials indicate that there has not been a flood of patent applications on software. *Id.*