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COMMENT

Computer Program Patentability—The CCPA Refuses to Follow the Lead of the Supreme Court in *Parker v. Flook*

The protection of computer programs and program-related inventions¹ by patents is an issue that has recently engendered much controversy and commentary.² Advocates of program patentability³ argue that protection for the investments of time and skill necessary to create computer programs is justified under classic patent theory. They reason that, by rewarding producers of new and useful programs with limited monopolies in exchange for public disclosure of their inventions, society at large will benefit.⁴ Opponents of program patentability, which include hardware manufacturers⁵ and the Patent and Trademark Office,⁶ contend that program patentability will not increase the

1. See notes 26 & 27 and accompanying text *infra*.

2. See, e.g., Ross, *The Patentability of Computer Firmware*, 59 J. PAT. OFF. SOC'Y 731 (1977); Soltysinski, *Computer Programs and the Patent Law: A Comparative Study*, 3 RUTGERS J. COMPUTERS & L. 1 (1973); Upchurch, *A Template for Judicial Resolution of Computer Program Patentability*, 9 GA. L. REV. 855 (1975); Note, *Gottschalk v. Benson—Bright Light—Dim Future*, 28 BAYLOR L. REV. 187 (1976); Comment, *Computer Program Classification: A Limitation on Program Patentability as a Process*, 53 ORE. L. REV. 501 (1974); Note, *Gottschalk v. Benson—The Supreme Court Takes A Hard Line on Software*, 47 ST. JOHNS L. REV. 635 (1973); Comment, *Patentability: Piecing Together The Computer Software Patent Puzzle*, 19 ST. LOUIS U.L.J. 351 (1975); 14 B.C. INDUS. COM. L. REV. 1050 (1973); authorities cited note 7 *infra*. A very good bibliography on the legal protection of computer software is found in Nimtz, *Development of the Law of Computer Software*, 61 J. PAT. OFF. SOC'Y 3, 26-43 (1979).

3. One of the main proponents of patentability is the rapidly expanding computer software industry. According to one estimate, the value of computer software in use in the United States in 1976 was \$43.1 billion and was projected to be \$70.7 billion by 1980. See *Parker v. Flook*, 437 U.S. 584, 587 n.7 (1978). Another estimate places user expenditures for software in 1978 alone at \$981 million. Cunningham & Smith, *Computer Services: A Menu of Options*, DATAMATION, May 25, 1979, at 89, 91. Although such estimates give a general idea of the size of the industry, different definitions of the term "software" often make comparison difficult. See note 24 *infra*.

4. See Davis, *Computer Programs and Subject Matter Patentability*, 6 RUTGERS J. COMPUTERS & L. 1, 19-20 (1977). The general theory is that the patent system encourages invention by rewarding inventors, attracts risk capital to industry research and prevents the hoarding of technological innovation. *Id.* The patent system in the United States is not based historically on any theory of natural right in the inventor. See *Graham v. John Deere Co.*, 383 U.S. 1, 7-9 (1966).

5. Hardware manufacturers are those firms that produce the actual computing machinery. Most hardware manufacturers have extensive libraries of programs and often sell or give these computer programs to their customers. The value of their machines increases with the availability of programs. Thus, it is generally in their interest to discourage program patentability. See generally Scafetta, *Computer Software Protection: The Copyright Revision Bills and Alternatives*, 8 JOHN MARSHALL J. PRAC. & PROC. 381 (1975); Davis, *supra* note 4, at 5-6 & n.25.

6. The Patent and Trademark Office, in charge of administering the patent laws in the United States, estimated that approximately 600-900 applications for program-related patents were pending in 1978, and that approximately 450 such applications are filed each year. Brief for

dissemination of new ideas and will do little to promote the already competitive research in the field.⁷ Judicial opinion on the subject has not focused on these essentially economic policy issues; rather, it has addressed the more technical question whether program-related inventions are truly inventions under applicable statutes and case law. More specifically, recent judicial discussion has centered on whether processes employing steps of a mathematical or algorithmic⁸ nature are properly included within the term "process" as used in section 101⁹ of the Patent Act. This Comment will summarize the case law on this issue as developed by the United States Court of Customs and Patent Appeals (CCPA)¹⁰ and will discuss the somewhat uncertain effect of the 1978 Supreme Court decision in *Parker v. Flook*.¹¹

The Constitution explicitly delegates to Congress the power to create a federal patent system.¹² The Constitution does not spell out any

Petitioner, *Parker v. Flook*, 437 U.S. 584 (1978), reprinted in PAT. T.M. & COPYRIGHT J., March 23, 1978, at D-1, D-7 n.24. A tremendous increase in such applications would undoubtedly occur if programs were clearly patentable. Notwithstanding the questionable status of program-related inventions in 1978 and 1979, there has been an increase in the number of applications in which the patentability of computer programs is an issue. See Petition for Certiorari, *Diamond v. Bradley*, No. 79-855 (U.S. 1979), reprinted in PAT. T.M. & COPYRIGHT J., Dec. 13, 1979, at E-1, E-4 (3,000 patent applications pending in which the patentability of computer software or firmware is a potential issue). The increased administrative burden and the practical difficulties inherent in executing prior art searches for program-related inventions probably account for the apparent hostility toward program patents shown by the Office. See Davis, *supra* note 4, at 21.

7. For a summary of arguments both for and against patentability, see Soltysinski, *supra* note 2, at 57-78. No discussion of the economic policy arguments for program patents is attempted in this Comment. Factors affecting analysis in this area include trade secret and copyright law, both of which may offer some protection to computer programs. Discussions comparing trade secret and copyright protection to that afforded by patents may be found in the following commentary: Bender, *Trade Secret Protection of Software*, 38 GEO. WASH. L. REV. 909 (1970); Davis, *supra* note 4; Note, *Copyright Protection for Computer Programs*, 64 COLUM. L. REV. 1274 (1964); Note, *Protection of Computer Software—A Hard Problem*, 26 DRAKE L. REV. 180 (1976-1977); Note, *Protection of Computer Programs: Resurrection of the Standard*, 50 NOTRE DAME LAW 333 (1974); Note, *Patentability of Computer Programs*, 27 U. MIAMI L. REV. 494 (1973).

8. See note 30 *infra*.

9. 35 U.S.C. § 101 (1970). This section specifies those categories of subject matter that may qualify for patent protection. It provides that "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." The term "method" is synonymous with "process" and the term "apparatus" is generally preferred to "machine" in discussion of patent claims. P. ROSENBERG, PATENT LAW FUNDAMENTALS 73, 76 (1975).

10. The CCPA has jurisdiction to review rejections of patent applications made by the Patent and Trademark Office under § 141 of the Patent Act, 35 U.S.C. § 141 (1976). All CCPA cases discussed herein are of this type. The Supreme Court may grant certiorari to review a decision of the CCPA under 28 U.S.C. § 1256 (1976).

11. 437 U.S. 584 (1978).

12. "The Congress shall have the Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." U.S. CONST. art. I, § 8.

subject matter requirements for patentability, but it does indicate that the objective of the system should be to promote the progress of science and the "useful arts."¹³ Congress must supply the statutory framework to further this objective. The exercise of this power, however, is permissive rather than mandatory; Congress may legitimately withhold patent protection from some, or even all, subject matter.¹⁴ Although the term "process" was not used by Congress to designate patentable subject matter until 1952,¹⁵ it was early held that processes could be patented under statutes authorizing protection for "any new and useful art."¹⁶ The present Patent Act gives little guidance in determining exactly which processes are meant to constitute patentable subject matter, providing only that "[t]he term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."¹⁷ Thus, with a few exceptions,¹⁸ case law provides the relevant principles for determining statutory subject matter.

The case law with respect to program-related inventions has produced a vast amount of confusion, partly due to the terminology and technology employed in the computer industry.¹⁹ Computers are generally defined to be devices "capable of accepting information, applying prescribed processes to the information and supplying the results of these processes."²⁰ Thus, computers are primarily devices for manipulating information, though physical processes must necessarily be involved in carrying out this task. The two basic categories of computers are defined by the way in which the physical processes are employed to

13. *Id.*

14. *See* McClurg v. Kingsland, 42 U.S. (1 How.) 202, 206 (1843).

15. Patent Act of 1952, Pub. L. No. 82-593, § 101 (codified at 35 U.S.C. § 101 (1976)).

16. *Corning v. Burden*, 56 U.S. (15 How.) 252, 267 (1853) (construing Patent Act of 1836, ch. 357, § 6, 5 Stat. 117 (1836)).

17. 35 U.S.C. § 100(b) (1976).

18. *See, e.g.*, Atomic Energy Act of 1954, § 151, 42 U.S.C. § 2181(a) (1976) (excluding inventions useful only in atomic weapons).

19. Judge Edenfield's comment on the matter is well known:

[T]he first finding the court is constrained to make is that, in the computer age, lawyers and courts need no longer feel ashamed or even sensitive about the charge, often made, that they confuse the issue by resort to legal "jargon," law Latin or Norman French. By comparison, the misnomers and industrial shorthand of the computer world make the most esoteric legal writing seem as clear and lucid as the Ten Commandments or the Gettysburg Address; and to add to this Babel, the experts in the computer field, while using exactly the same words, uniformly disagree as to precisely what they mean.

Honeywell, Inc. v. Lithonia Lighting, Inc., 317 F. Supp. 406, 408 (1970).

20. C. SIPPL & C, SIPPL, COMPUTER DICTIONARY AND HANDBOOK 99 (2d ed. 1972).

solve problems. Analog computers work by translating physical conditions, such as velocity or temperature, into related mechanical or electrical quantities and then using mechanical or electrical-equivalent circuits as an analog for the physical phenomenon being investigated.²¹ Digital computers process information represented by combinations of discrete or discontinuous data. The data is represented by electrical impulses, and mathematical and logical operations are simulated by directing these impulses through the computer's circuitry by the use of programs.²² The actual circuitry and other physical items in the computer are often called "hardware." When drafted in structural terms a claim for patent protection of hardware presents no different patent law problems than does a claim for any other electronic device.²³ Computer programs, however, are part of the computing system's "software."²⁴ A program may be defined as "a series of instructions or statements, in a form acceptable to a computer, prepared in order to achieve a certain result."²⁵ The essence of the program is the nature of the instructions, not the particular physical embodiment.²⁶ As used in

21. See D. BENDER, *COMPUTER LAW: EVIDENCE AND PROCEDURE* § 2.01 (1978). The circuit equations in an analog computer have the same mathematical form as the problem equations. This allows the analog computer to solve problems by analogy, varying the voltages in its circuitry to represent physical data outside the computer. *Id.* The analog computer is normally a special purpose device used in a scientific or technological context and is not commonly used in commercial applications. *Id.* at 2-5.

22. See *id.* § 2.02-.05. Nearly all digital computers employ the principles of binary arithmetic. The most basic unit of information is the "binary digit," or "bit." It may have only one of two values (e.g., 0 or 1). A sequence of adjacent bits, usually eight, forms a "byte," and "bytes" combine to form "words." Information is coded into this form and sent into the computer via electronic impulses. The information may be stored by setting up states of magnetic polarity on very small pieces of ceramic, by using semiconductors or by various other means. See *id.* § 2.05[3]. Information thus stored in the computer's "memory" is known as the data base. Most of what the computer does can be broken down into the four arithmetic operations (addition, subtraction, multiplication, and division) and the comparison of one quantity with another. *Id.* § 2.05[4], at 2-90. For example, the proper construction of switching networks to control the path of the electronic impulses and "registers" to store the impulse data will produce circuitry that will "add" binary numbers. The most elemental arithmetic operations may be performed with such fixed circuitry. It is computer programs, however, that direct impulses through the circuitry to effect the more complicated operations that make the computer useful.

23. See *In re Maucorps*, 203 U.S.P.Q. (BNA) 812, 816 (C.C.P.A. Nov. 1, 1979); *In re Freeman*, 573 F.2d 1237, 1247 n.10 (C.C.P.A. 1978).

24. The term "software" is sometimes used to denote three components of a computing system—the programs, the data base and the documentation. D. BENDER, *supra* note 21, § 2.06, at 2-112. The documentation is the collection of documents that explain or describe the functioning of any part of the computing system. The term "software" is also used when referring only to programs.

25. *Id.*; accord, *In re Ghiron*, 442 F.2d 985, 986 (C.C.P.A. 1971) ("a set of instructions for carrying out prearranged operations on data by use of processing equipment").

26. The computer program may start out as a stack of punched cards, but when introduced into the computer it may exist only as a series of magnetic polarities in the computer's "memory." See note 22 *supra*. It is nonetheless the same program.

System programs, often called system software, control the performance and functions of the

this Comment, the term "program-related invention" will refer to a process or apparatus the patenting of which would protect one or more computer programs. Thus, a patent claim²⁷ that encompasses or "reads on" a set of instructions, in a form acceptable to a computer, will constitute a claim on a program-related invention.

In the recent case of *Parker v. Flook*,²⁸ the United States Supreme Court found that a program-related invention consisting of a new method for updating alarm limit values of process variables in the catalytic conversion of hydrocarbons²⁹ was not within the meaning of "process" as used in section 101 of the Patent Act. The method employed as its sole novel element a mathematical algorithm³⁰ designed

computer hardware by regulating the execution of other programs, optimizing the efficiency of the system, and generally providing the link between programming languages that are understood by human beings and the computer's circuitry. Application programs instruct the computer on how to solve particular problems. See D. BENDER, *supra* note 21, § 2.06. The control of the computer achieved by systems and application programs theoretically could be accomplished by an actual physical rewiring of the computer, but this would be impractical. It is instructive, however, to think of programs as automatically "rewiring" or "softwiring" the computer, and some commentators have characterized programs as "instant hardware." See Comment, *Patents and Computer Programs—The Supreme Court Makes A Decision*, 62 Ky. L.J. 533, 534 (1974).

27. The claims in a patent application are the only definitive statement of the invention; they alone describe the boundaries of the monopoly that the inventor seeks. When a reading of a claim indicates that a particular process or apparatus would be covered should a patent issue, the claim is said to "read on" that subject matter. P. ROSENBERG, *supra* note 9, at 38.

There are three cardinal rules that must be observed in order to present a valid claim: (1) each claim must be expressed in a single sentence; (2) the object of each claim must read on the unique combination of features which are distinctive of and which characterize the invention; and (3) the object of each claim must not read on a combination of features found united in the same manner in the prior art. *Id.*

28. 437 U.S. 584 (1978). Lutrelle F. Parker was Acting Commissioner of the Patent and Trademark Office at the time the petition for writ of certiorari was filed. Dale R. Flook was the inventor.

29. The Court explained the invention as follows:

An "alarm limit" is a number. During catalytic conversion processes, operating conditions such as temperature, pressure, and flow rates are constantly monitored. When any of these "process variables" exceeds a predetermined "alarm limit," an alarm may signal the presence of an abnormal condition indicating either inefficiency or perhaps danger. Fixed alarm limits may be appropriate for a steady operation, but during transient operating situations, such as start-up, it may be necessary to "update" the alarm limits periodically.

Respondent's patent application describes a method of updating alarm limits. In essence, the method consists of three steps: an initial step which merely measures the present value of the process variable (*e.g.* the temperature); an intermediate step which uses an algorithm to calculate an updated alarm-limit value; and a final step in which the actual alarm limit is adjusted to the updated value.

Id. at 585 (footnotes omitted).

The catalytic conversion of hydrocarbons is a common process in the petrochemical and oil refining industries. Thus, Flook's claims covered a broad range of potential uses. Uses outside the catalytic conversion of hydrocarbons were also conceivable but were not claimed. *Id.* at 586.

30. *Id.* at 584. The Court defined "algorithm" as a "procedure for solving a given type of mathematical problem," a definition that previously had been used by the Court in *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972). 437 U.S. at 584 n.1. In the context of computer programming, the

primarily for automated use in a digital computer. The Court reaffirmed its holding in *Gottschalk v. Benson*³¹ that an algorithm or mathematical formula is one of the "basic tools of scientific and technological work" and, therefore, not patentable subject matter.³² The Court went on to point out that a process is not unpatentable simply because it contains an algorithm; the application of an algorithm to a new and useful end definitely may constitute patentable subject matter.³³ Such an application itself, however, must contain some inventive concept other than the algorithm if the claimed process is to rise to the status of a patentable invention.³⁴ Because Flook's method, except for his algorithm, consisted entirely of steps well-known in the industry, the Court held there was no inventive concept and thus no patentable subject matter.³⁵ The Supreme Court in *Parker v. Flook* thus announced a new test for the subject matter patentability of processes embodying mathematical algorithms. The algorithm or formula, regardless of its novelty, must first be considered to be within prior art, and the process must then be evaluated to determine whether a patentable invention exists by virtue of an inventive application of the algorithm or formula.

Justice Stewart, speaking for the three dissenting members of the Court,³⁶ found that this test improperly injected criteria of novelty and inventiveness, the subjects of sections 102³⁷ and 103³⁸ of the Patent Act respectively, into the consideration of subject matter patentability as

definition is usually not specifically limited to mathematical problem solving procedures. "An algorithm is a rigidly defined, step-by-step procedure for solving a particular problem in a finite number of steps; the algorithm yields a solution to the particular problem under all circumstances." D. BENDER, *supra* note 21, § 2.06[3][a], at 2-118 n.23.

31. 409 U.S. 63 (1972). See text accompanying notes 84-96 *infra*.

32. 437 U.S. at 590.

33. *Id.* at 591.

34. *Id.* at 594.

35. *Id.*

36. Chief Justice Burger and Justice Rehnquist joined in the dissent. *Id.* at 598.

37. 35 U.S.C. § 102 (1976). This section provides in part: "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 application for patent."

38. 35 U.S.C. § 103 (1976). This section reads as follows:

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 negated by the manner in which the invention was made.

defined by section 101.³⁹ Although the dissenters reserved judgment on whether a patent should have actually issued under sections 102 and 103, they agreed with the the Court of Customs and Patent Appeals that the method in *Flook* passed the test for subject matter patentability.⁴⁰ In doing so, the dissenters specifically approved the rationale used in a recent line of cases by the Court of Customs and Patent Appeals.⁴¹ These cases relied on the CCPA's interpretation of the Supreme Court's decision in *Gottschalk v. Benson*, and, in part, on CCPA cases decided before *Benson*. The CCPA has not yet abandoned the principles enunciated in the cases prior to *Flook*. CCPA cases decided after *Flook* indicate that, notwithstanding the Supreme Court's new test for subject matter patentability, CCPA policy toward program-related inventions will change little. Thus, an analysis of the state of the law in this area requires review of the older CCPA cases.

I. EARLY DEVELOPMENT OF THE CASE LAW: THE MENTAL PROCESS DOCTRINE

The first notable judicial opinion concerning the patentability of a program-related invention was *In re Prater*.⁴² In *Prater*, the CCPA reviewed a rejection by the Patent Office of process and apparatus claims for a new method of processing spectrographic data. The object of the new method was to select those equations least susceptible to error amplification in certain types of spectrographic analysis.⁴³ The claimed method involved using mathematical calculations for generating equations, comparing the determinant functions of various subsets of the equations and reproducing a spectrogram based on the subset of equations having the highest mathematical determinant.⁴⁴ Because the method claims encompassed the performance of the method by a properly programmed digital computer,⁴⁵ the claimants, in effect, sought protection for a computer program. In their apparatus claims the in-

39. 437 U.S. at 600 (Stewart, J., dissenting). The text of § 101 of the Patent Act, 35 U.S.C. § 101 (1970), appears at note 9 *supra*.

40. 437 U.S. at 600.

41. *Id.* The cases mentioned were *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978); *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977); *In re de Castelet*, 562 F.2d 1236 (C.C.P.A. 1977); *In re Deutsch*, 553 F.2d 689 (C.C.P.A. 1977); and *In re Chatfield*, 545 F.2d 152 (C.C.P.A. 1976), *cert. denied*, 434 U.S. 875 (1977).

42. 415 F.2d 1378 (C.C.P.A. 1968), *modified on rehearing*, 415 F.2d 1393 (C.C.P.A. 1969).

43. The spectrographic analysis referred to in the invention was intended to produce data on the relative proportions of various known constituent gases in a mixture of gases. 415 F.2d at 1378.

44. *Id.* at 1380.

45. *Id.*

ventors sought protection for any means of performing the method as described in the method claim,⁴⁶ and in their specification⁴⁷ disclosed an analog device capable of performing such a function.⁴⁸

The Patent Office had based its rejection in *Prater*, in part, on the mental process doctrine. The roots of this doctrine apparently stemmed from cases holding that methods requiring mental steps such as emotional reactions or subjective judgment for their performance were not proper subjects for patents.⁴⁹ One rationale for this doctrine was that the results produced by such methods would not be predictable and that the method thus would be too vague and indefinite to constitute patentable subject matter.⁵⁰ Another rationale was that thought processes were not "useful arts," and, thus, not the sort of tangible embodiments of ideas contemplated as patentable in the Constitution.⁵¹ Assuming the mathematical calculations required in the *Prater* claims to be unpatentable mental steps would not have ended the matter, however, because an invention may include, as a component, unpatentable subject matter and, nevertheless, constitute, as a whole, a patentable invention.⁵² To solve this problem, the Patent Office used three "rules" mentioned in *In re Abrams*,⁵³ an earlier mental process case involving mathematical calculations. The *Abrams* rules were designed to determine whether a process was statutory on the basis of the alleged point of novelty:

1. If all the steps of a method claim are purely mental in character, the subject matter thereof is not patentable within the meaning of the patent statutes.

46. *Id.* at 1381. The apparatus claims were couched in "means plus function" form. A claim of this type is construed to read on any means capable of performing the functions as described. This is the broadest and most generalized mode of claiming allowed and is usually reserved for pioneer invention. It is, however, expressly sanctioned by § 112 of the Patent Act, 35 U.S.C. § 112, para. 3 (1976). See P. ROSENBERG, *supra* note 9, at 47-50.

47. A patent application must contain a written description of the claimed invention in such terms as will enable any person "skilled in the art" to make and use the invention. 35 U.S.C. § 112, para. 1 (1976). This part of the application directly precedes the claims, but is not part of the claims. Although the term "specification," as used in the Patent Act, clearly includes the claims, the term is commonly used to refer only to this detailed description or disclosure. See P. ROSENBERG, *supra* note 9, at 200.

48. 415 F.2d at 1379.

49. McClaskey, *The Mental Process Doctrine: Its Origin, Legal Basis and Scope*, 55 IOWA L. REV. 1148, 1179-80 (1970).

50. *Id.*

51. See *In re Sarker*, 588 F.2d 1330 (C.C.P.A. 1978). Cf. *In re Abrams*, 188 F.2d 165, 168 (C.C.P.A. 1951) ("It is self evident that thought is not patentable.").

52. See, e.g., *Mackay Radio & Tel. Co. v. Radio Corp. of America*, 306 U.S. 86 (1939) (antenna constructed in conformance with mathematical formula patentable invention).

53. 188 F.2d 165 (C.C.P.A. 1951).

2. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the alleged novelty or advance over the art resides in one or more of the so-called mental steps, then the claim is considered unpatentable for the same reason that it would be if all the steps were purely mental in character.
3. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the novelty or advance over the art resides in one or more of the positive and physical steps and the so-called mental step or steps are incidental parts of the process which are essential to define, qualify or limit its scope, then the claim is patentable and not subject to the objection contained in 1 or 2 above.⁵⁴

The Patent Office argued that the *Prater* method claims were clearly within rule two because their point of novelty was purely mental in character and that they were thus unpatentable subject matter.⁵⁵ The apparatus claims were rejected because they "read on"⁵⁶—that is, they could be read as seeking patent protection for—a properly programmed digital computer. No protection could be accorded such a device under rule two of *Abrams*. Because the claims appeared to seek protection for the unpatentable subject matter, the Patent Office maintained that the claims did not particularly point out and distinctly claim the invention as required by section 112 of the Patent Act.⁵⁷

Judge Smith, speaking for the CCPA in the first *Prater* opinion, stated that the *Abrams* court had accepted the rules enunciated in that case only *arguendo*, and that the present court would not feel constrained by them.⁵⁸ He also noted that the often-cited proposition that processes must operate physically on substances in order to constitute patentable subject matter derived from a misreading of a passage in *Cochrane v. Deener*⁵⁹ and had been discredited by later Supreme Court cases.⁶⁰ Having thus cleared the way for an unencumbered statement

54. *Id.* at 166.

55. 415 F.2d at 1381.

56. For an explanation of the term "read on," see note 27 *supra*.

57. 415 F.2d at 1381-82. 35 U.S.C. § 112, para. 2 (1976) provides: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." The Patent Office also made other rejections based on 35 U.S.C. § 112 and 35 U.S.C. § 103. The rejections were all reversed in the first *Prater* opinion. *But see* note 64 *infra*.

58. 415 F.2d at 1386, 1389.

59. 94 U.S. 780 (1876).

60. 415 F.2d at 1387-88. The language in *Cochrane* indicated that a patentable process must transform substances into a different state or thing:

A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. . . . The process requires that certain things should be done

on program-related inventions, the court held that the disclosure of a machine capable of performing the claimed combination of steps distinguished the *Prater* method from ones previously held unpatentable under the mental process doctrine. That the process steps could be alternatively performed in the human mind, or with aid of a pencil and paper, was held not to be fatal to the claims.⁶¹ The process was directed to use in an industrial technology that was clearly within the meaning of "useful arts."⁶² This reasoning saved the method and apparatus claims from rejections based on the mental process doctrine as employed in the *Abrams* rules.⁶³ Although the court later sustained the Patent Office rejection of the method claims under paragraph two of section 112,⁶⁴ the clear signal from the CCPA in *Prater* was that computer program-related inventions could avoid the mental process doctrine with properly drafted claims.⁶⁵

Subsequent cases confirmed the CCPA's willingness to narrow the mental process doctrine so as not to preclude the patenting of fundamentally machine-implemented processes. In *In re Bernhart*,⁶⁶ the inventors sought to claim an apparatus and method for automatically making a two-dimensional portrayal of a three-dimensional object using a computer and an attached planar plotting apparatus. Because the

with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.

94 U.S. at 788.

Judge Smith argued that the language, in addition to being dictum, was never intended to limit statutory processes, but was instead meant to point out that a process is not limited to the particular means used in performing it. 415 F.2d at 1387-88.

61. 415 F.2d at 1389.

62. *Id.*

63. *Id.*

64. On rehearing, 415 F.2d 1393 (C.C.P.A. 1969), the court generally approved Judge Smith's analysis of *Abrams* and *Cochrane* and agreed that the capability of machine implementation distinguished the *Prater* claims from those in previous cases. The court noted, however, that the inventors alleged that they did not seek protection for the mental performance of the method described. Because the method claims did read on such a performance of the method, the inventors had failed to satisfy the requirements of 35 U.S.C. § 112, para. 2 quoted at note 57 *supra*. 415 F.2d at 1404.

65. No reason is now apparent to us why, based on the Constitution, statute, or case law, apparatus and process claims broad enough to encompass the operation of a programmed general-purpose digital computer are necessarily unpatentable. In one sense, a general-purpose digital computer may be regarded as but a storeroom of parts and/or electrical components. But once a program has been introduced, the general-purpose digital computer becomes a special-purpose digital computer (i.e., a specific electrical circuit with or without electro-mechanical components) which, along with the process by which it operates, may be patented subject, of course, to the requirements of novelty, utility, and non-obviousness. Based on the present law, we see no other reasonable conclusion.

415 F.2d at 1403 n.29 (on rehearing) (emphasis in original).

66. 417 F.2d 1395 (C.C.P.A. 1969).

concept of computer drawing was known in the prior art at the time, the inventors' particular mathematical equation for three-to-two dimensional transformation was the only novel component of the invention.⁶⁷ The court found that the method and apparatus claims covered only machine implementation of the described method and, therefore, avoided any mental process or section 112 objections.⁶⁸ In reviewing a rejection of the apparatus claims based on the *Abrams* rules, the court criticized the "point of novelty" approach taken in that case as being inconsistent with the intent of Congress as expressed in sections 101 and 103 of the Patent Act.⁶⁹ The court also suggested that, because a programmed computer was a different machine from an unprogrammed one, new computer programs might be easily protected in the form of apparatus claims.⁷⁰

Although it refused to make a blanket ruling on the patentability of programs per se, the CCPA continued to make the claiming of program-related inventions an easy task. The court began to rely on a more liberal standard of reasonableness in claim interpretation so as to avoid section 112 objections like those expressed in *Prater*.⁷¹ In *In re Musgrave*,⁷² the court again criticized the point of novelty approach,

67. *See id.* at 1396, 1398.

68. *Id.* at 1401.

69. The principle may, we think, be fairly stated as follows: If, in an invention defined by a claim, the novelty is indicated by an expression which does not itself fit in a statutory class . . . then the whole invention is non-statutory since all else in the claim is old. We do not believe this view is correct under the Patent Act and the case law thus far developed.

. . . [A]ll machines function according to laws of physics which can be mathematically set forth if known. We cannot deny patents on machines merely because their novelty may be explained in terms of such laws if we are to obey the mandate of Congress that a machine is subject matter for a patent. We should not penalize the inventor who makes his invention by discovering new and unobvious mathematical relationships which he then utilizes in a machine, as against the inventor who makes the *same machine* by trial and error and does not disclose the laws by which it operates. The mandate of Congress in 35 U.S.C. § 103 is that "patentability shall not be negated by the manner in which the invention was made."

Id. at 1399-1400.

70. [I]f a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed. If a new machine has not been invented, certainly a 'new and useful improvement' of the unprogrammed machine has been, and Congress has said in 35 U.S.C. § 101 that such improvements are statutory subject matter for a patent.

Id. at 1400. *See* note 26 *supra*.

71. *See, e.g., In re Mahony*, 421 F.2d 742 (C.C.P.A. 1970) (term "bit" when used in "bit stream" precludes claim from reading on mental processes). *See also* 14 B.C. INDUS. COM. L. REV. 1050 at 1053-60 (1973).

72. 431 F.2d 882 (C.C.P.A. 1970).

noting that subject matter patentability was, by definition, not an issue that depended on the novelty of the subject matter.⁷³ Another passage in *Musgrave* announced a test for statutory processes that confirmed the original holding in *Prater* and suggested that the only limits on the subject matter patentability of processes were constitutional ones.⁷⁴

The reasoning of *Musgrave* was employed in *In re Benson*⁷⁵ to approve the subject matter patentability of a method for converting binary coded decimal numerals into pure binary numerals.⁷⁶ The claims were couched in terms of a mathematical algorithm and were designed as a more efficient way to convert numerical values stored in a digital computer.⁷⁷ The court noted at the outset of the opinion that, unlike most previously claimed inventions in this area, the *Benson* claims were addressed solely to the art of data processing and not to any particular end use.⁷⁸ One of the method claims was so broadly drawn, however, that, if read literally, it encompassed the human performance of the mathematical operation described by the algorithm as well as any electromechanical implementation.⁷⁹ Judge Rich, speaking for a unanimous court, found that, under a reasonable interpretation, the claimed

73. It should be apparent . . . that novelty and advancement of an art are irrelevant to a determination of whether the nature of a process is such that it is encompassed by the meaning of "process" in 35 U.S.C. § 101. Were that not so . . . a given process including both "physical" and "mental" steps could be statutory during the infancy of the field of technology to which it pertained, when the physical steps were new, and non-statutory at some later time after the physical steps became old, acquiring prior art status, which would be an absurd result. Logically, the identical process cannot be first within and later without the categories of statutory subject matter, depending on such extraneous factors.

Id. at 889.

74. We cannot agree . . . that these claims (all of the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because some or all the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think. *All that is necessary, in our view, to make a sequence of operational steps a statutory 'process' within 35 U.S.C. § 101 is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of the "useful arts."*

Id. at 893 (referring to U.S. CONST. art. I, § 8) (emphasis added). See also *In re Waldbaum*, 457 F.2d 997, 1003-04 (C.C.P.A. 1972) (commenting on synonymy of "useful arts" and "technological arts").

75. 441 F.2d 682 (C.C.P.A. 1971), *rev'd sub nom.* *Gottschalk v. Benson*, 409 U.S. 63 (1972).

76. Binary numerals, or "base two" numerals, represent numbers using only two symbols (e.g., "0" and "1"), rather than the ten symbols commonly used in the decimal system (0, 1, 2, 3 . . . 9). Binary coded decimals are essentially decimal, but each decimal digit is represented with a group of binary numerals. Digital computers normally work in the pure binary system, but when extensive arithmetic operations are not required, and time required for converting to and from the decimal system is important, the binary coded decimal system is useful. See D. BENDER, *supra* note 21, § 2.03[2].

77. 441 F.2d at 682-83.

78. *Id.* at 686.

79. *Id.* at 688.

process had "no practical use other than the more effective operation and utilization of a *machine* known as a digital computer."⁸⁰ Because such computers were within the "technological field" and thus within the concept of the "useful arts," the process passed the *Musgrave* test and was held to be patentable subject matter.⁸¹

II. THE EFFECT OF *GOTTSCHALK V. BENSON*

After the CCPA's opinion in *In re Benson* it was clear that any new and useful computer program, properly claimed, could qualify as patentable subject matter. The Patent Office, having neither a classification technique nor a prior art searching system adequate for the large number of programs on the market at the time,⁸² obtained a writ of certiorari from the Supreme Court.⁸³ In *Gottschalk v. Benson*,⁸⁴ the Supreme Court neither discussed nor mentioned the line of CCPA cases leading up to *In re Benson*, but did agree with the Patent Office that the claimed method was unpatentable subject matter under section 101 of the Patent Act. The Court used older, established precedent to support the proposition that mathematical formulae and algorithms⁸⁵ were, like ideas, phenomena of nature and scientific principles, unpatentable subject matter.⁸⁶ The algorithm embodied in the *Benson* claims, when separated from the context of computer implementation, was nothing more than a mathematical formula, an idea or abstract concept, and, as such, fell into the category of unpatentable subject matter.⁸⁷ The Court held that limiting the method claims to implementation within a digital computer would not take the process out of the category of excluded matter because the only substantial practical application of the algorithm was within such a device; a patent on the computer implementation of the algorithm would totally preempt the algorithm and would be, in effect, a patent on the algorithm itself.⁸⁸

80. *Id.* (emphasis in original).

81. *Id.*

82. See *Gottschalk v. Benson*, 409 U.S. 63, 72 (1972).

83. 405 U.S. 915 (1972).

84. 409 U.S. 63 (1972).

85. See note 30 *supra*.

86. 409 U.S. at 67. The Court cited *Mackay Radio & Tel. Co. v. Radio Corp. of America*, 306 U.S. 86 (1938) (scientific truth, or mathematical expression of scientific truth, not patentable); *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498 (1874) (idea not patentable); and *Le Roy v. Tatham*, 55 U.S. (14 How.) 156 (1852) ("principle in the abstract" not patentable).

87. "Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work." 409 U.S. at 67.

88. "The mathematical formula involved here has no substantial practical application except

The above analysis became known as the "nutshell" of the *Benson* opinion. The only clear holding was that mere computer implementation of a mathematical algorithm would not qualify the algorithm as a patentable process if all practical uses of the algorithm were thereby preempted.⁸⁹ Other portions of the opinion were emphasized by various commentators with widely different results in interpretation. The Court discussed *Cochrane v. Deener* and the line of cases following it suggesting that "transformation 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."⁹⁰ Immediately after discussing this line of cases, however, the Court declared that "we do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents."⁹¹ Some observers, nevertheless, felt that *Benson* was based on *Cochrane*.⁹² Other language in *Benson*—including the "nutshell"—indicated that the objectionable aspect of the claims was that all practical uses of the algorithm, both known and unknown, were covered.⁹³ The Court pointed to the seminal case on processes, *O'Reilly v. Morse*,⁹⁴ in which a patent was allowed for a process of using electromagnetism to produce distinguishable signals for telegraphy. The Court noted that Morse's eighth claim, for the use of "electromagnetism, however developed, for marking or printing intelligible characters, signs, or letters, at any distances," was declared invalid because of its undue breadth.⁹⁵ Morse had, in effect, attempted to monopolize a scientific principle whenever it was used to accomplish a given end result. Although not distinguished by the Court, the breadth

in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself." *Id.* at 71-72.

89. Some language in *Benson* suggested that the Court did not recognize one of the process claims as being limited to machine implementation. *See id.* at 68. The language in the "nutshell," however, implies that limitation of claims to machine implementation is not a saving factor. *See* note 88 *supra*.

90. 409 U.S. at 70.

91. *Id.* at 71.

92. *See, e.g.,* Note, *Computer Software: Beyond the Limits of Existing Proprietary Protection Policy*, 40 BROOKLYN L. REV. 116, 139-40 (1973). In *Parker v. Flook*, the Supreme Court stated that the *Benson* decision did not rely on *Cochrane*. 437 U.S. at 588 n.9.

93. Here the "process" claim is so abstract and sweeping as to cover both known and unknown uses of the [binary coded decimal] to pure binary conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus.

409 U.S. at 68.

94. 56 U.S. (15 How.) 62 (1853).

95. 409 U.S. at 68.

of at least one of Benson's claims was caused by a different factor: the means of applying the principle was distinctly claimed—the mathematical relationship between binary and binary coded decimal numerals was claimed within the context of a process for the automatic processing of data. Benson's claims were considered overly broad because no specific end use other than "data processing" limited the scope of the claims. Thus, some observers felt that an inventor might avoid the rationale in *Benson* by limiting the end use of the algorithm in his claims.⁹⁶ Also left unclear by *Benson* was the status of the CCPA cases leading up to *Benson*, especially as they related to the point of novelty approach to subject matter patentability and the policy on statutory processes announced in *Musgrave*.

With apparent dissatisfaction among members of the court concerning the clarity of the *Benson* opinion,⁹⁷ the CCPA began its task of interpreting that decision. *In re Christensen*,⁹⁸ decided seven months after the Supreme Court's decision in *Benson*, involved the subject matter patentability of a method for determining subsurface porosity.⁹⁹ The method included several physical steps, the purpose of which was to collect geological data, but the only novel element of the method was the final step, a mathematical formula that used the collected data to calculate porosity.¹⁰⁰ The court found that *Benson* prohibited the patenting of a method for solving mathematical equations and that the *Christensen* claims attempted to do just that. The addition of old and necessary antecedent steps for collecting values to be used in the formula did not make the method any less a method of calculation.¹⁰¹

96. See, e.g., Comment, *Computer Program Classification: A Limitation on Program Patentability as a Process*, 53 ORE. L. REV. 501, 518-19 (1974).

97. See *In re Christensen*, 478 F.2d 1392, 1395-96 (C.C.P.A. 1973) (Rich, J., concurring).

98. 478 F.2d 1392 (C.C.P.A. 1973).

99. *Id.* at 1392. Porosity is a geological concept that expresses the ratio of the volume of pores or interstices of a rock or rock stratum to the total volume of the mass. It is commonly used in prospecting for oil.

100. *Id.* at 1392-93.

101. *Id.* at 1394. Confusion was created in later cases because of language in *Christensen* that suggested a "point of novelty" approach: "The issue before us in the instant case is . . . a narrow one, namely, is a method claim in which the point of novelty is a mathematical equation to be solved as the final step of the method, a statutory method? We follow the Supreme Court in concluding that the answer is in the negative." *Id.* In a later case the CCPA effectively "read out" the point of novelty language by holding that a method including a mathematical equation as the final step was nonstatutory notwithstanding the novelty of the antecedent data-collecting steps. *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977). See text accompanying notes 139-44 *infra*.

The CCPA in *Christensen* reserved judgment on the viability of the mental steps doctrine, but clearly indicated that it considered the *Benson* doctrine to be separate. 478 F.2d at 1395. Because the *Benson* doctrine appeared to apply directly to program-related inventions, the Patent Office relied on the mental process doctrine less often. Its importance has, for this reason, diminished.

Furthermore, merely limiting use of the results of the calculation to the single purpose of determining porosity did not take the method out of the *Benson* rationale that mathematical formulae and algorithms are not subject to preemption by patents.¹⁰²

In *In re Chatfield*,¹⁰³ however, the court countered Patent Office arguments that *Benson* proscribed the patenting of all program-related inventions,¹⁰⁴ and held a method of operating a computer system concurrently upon more than one processing program to be statutory subject matter.¹⁰⁵ As in *Benson*, the method under consideration involved the internal operation of a computing system and had no specified end use outside the art of data processing. The court, however, found that, because the algorithms in the *Chatfield* method were located only in the dependent claims,¹⁰⁶ issuance of a patent would not preempt any of the algorithms.¹⁰⁷ The claims were viewed as being directed not to the algorithms *per se*, but rather to a method of operating a computing system (described in the independent claims) in which certain analytical steps were to be carried out by the use of the specified algorithms.¹⁰⁸ Because patenting a method incorporating a dependent claim would preempt the algorithm therein only insofar as it could be used in the claimed method as a whole, there would not be, in practical effect, a patent on the algorithm itself.¹⁰⁹ Unlike the *Christensen* method, which was essentially a method for solving an equation, the *Chatfield* method was found to be a method for operating computing machines.¹¹⁰ Em-

102. 478 F.2d at 1396 (Rich. J., concurring); see text accompanying note 96 *supra*.

103. 545 F.2d 152 (C.C.P.A. 1976), *cert. denied*, 434 U.S. 875 (1977).

104. The Patent Office argued that certain language in *Benson* indicated that there should be a moratorium on program patents until Congress had spoken: "If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage . . ." 409 U.S. at 73 (footnote omitted). Other language in *Benson*, however, pointed in the opposite direction: "It is said that the decision precludes a patent for any program servicing a computer. We do not so hold." *Id.* at 71. Notwithstanding a statement in *Dann v. Johnston*, 425 U.S. 219 (1976), characterizing the holding in *Benson* as "limited," two of the five-member panel in *Chatfield* agreed with the Patent Office in their dissent. 545 F.2d at 159 (dissenting opinion).

105. A "processing program" or "application program" processes data for some ultimate use outside the computer. Most large computers work with more than one such program in the main memory at any given time in order to maximize the use of the computer's operating capacity. *Chatfield*'s method described a new way of assigning program priorities within a computer's central processing unit. 545 F.2d at 153-54. See also note 26 *supra*.

106. A dependent claim is one that incorporates by reference another claim. It is construed to include all the limitations of the incorporated claim. An independent claim is simply a claim that does not incorporate another claim by reference. See P. ROSENBERG, *supra* note 9, at 201.

107. 545 F.2d at 158-59.

108. *Id.*

109. *Id.*

110. *Id.*

phasizing that claimed inventions must be viewed as a whole, the court indicated that the "point of novelty" approach was not to be used in conjunction with the *Benson* doctrine to determine subject matter patentability.¹¹¹

While the Patent and Trademark Office (PTO)¹¹² continued to employ the "point of novelty" approach in conjunction with the *Benson* rationale when rejecting program-related inventions,¹¹³ the CCPA looked to other criteria in hopes of formulating a workable doctrine. Under consideration in *In re Deutsch*¹¹⁴ was a method of operating a system of multi-unit manufacturing plants using a computing apparatus to optimize selected process variables. The court viewed the process not as a method of calculation, but as an "industrial process . . . even further removed from that 'process' of *Benson* than was that of *Chatfield*."¹¹⁵ The court found that the claims did not seek to preempt a mathematical algorithm because any algorithm disclosed would be freely available for use by the public for any purpose other than the operation of a system of plants as described in the claims.¹¹⁶ Thus avoiding the rationale of *Christensen* and *Benson*, the invention was further found to be within a "technologically useful art" and, therefore, to be a statutory process under section 101 of the Patent Act.¹¹⁷

The CCPA indicated in *In re Waldbaum*,¹¹⁸ however, that simply

111. To support its rejection of the "point of novelty" approach the court quoted a passage from *In re Bernhart*, 417 F.2d 1395 (C.C.P.A. 1969), part of which appears in note 69 *supra*.

In the companion case to *Chatfield*, *In re Noll*, 545 F.2d 141 (C.C.P.A. 1976), a three-to-two majority also found that *Benson* would not apply if the claims for computer programs were drawn in apparatus form. The reasoning in that case was also apparently based on *Bernhart*. See note 70 and accompanying text *supra*. In the later case of *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978), however, the court clarified its position by indicating that "means plus function" apparatus claims would not suffice to take the invention out of the *Benson* rationale if equivalent method claims would be proscribed by *Benson*. 573 F.2d at 1247 & nn.10 & 11. See also *In re Maucorps*, 203 U.S.P.Q. (BNA) 812 (C.C.P.A. Nov. 1, 1979). Thus, the status of apparatus claims on program-related inventions will be determined by examination of equivalent method claims unless the apparatus is described in structural terms. Although the Supreme Court was given the opportunity to decide this issue in *Dann v. Johnston*, 425 U.S. 219 (1976), it declined to do so, preferring instead to decide the case on § 103 grounds.

112. The Patent Office was renamed "The Patent and Trademark Office" in 1975. Act of Jan. 2, 1975, Pub. L. No. 93-596, 88 Stat. 1949 (1975).

113. See, e.g., *In re Toma*, 575 F.2d 872, 876 (C.C.P.A. 1978); *In re Richman*, 563 F.2d 1026, 1029 (C.C.P.A. 1977); *In re de Castelet*, 562 F.2d 1236, 1240 (C.C.P.A. 1977). In each of these cases the CCPA stated that the point of novelty approach was improper and would not be accepted by the court for the reasons cited in *Chatfield*.

114. 553 F.2d 689 (C.C.P.A. 1977).

115. *Id.* at 692.

116. *Id.*

117. *Id.* at 693.

118. 559 F.2d 611 (C.C.P.A. 1977).

limiting the claims of an invention unpatentable under *Benson* so as to prevent total preemption of the algorithm would not serve to bring the invention into the category of patentable subject matter. The process in *Waldbaum* was basically a method, described in terms of machine steps, employing a mathematical algorithm for "counting" the relative number of "0's" and "1's" in a "data word."¹¹⁹ Although the method had general applicability in digital computers, one group of claims limited the monopoly sought to a specific application of the method in the counting of busy and idle lines in a telephone system.¹²⁰ While noting that a patent on such a method would not, as in *Benson*, preempt *all* uses of the algorithm, the court recognized that the method was "directed to a calculation," the counting of busy and idle telephone lines.¹²¹ A patent on the method would have preempted all use of the algorithm in making that particular calculation and would have been, "in practical effect, . . . a patent on the algorithm itself."¹²² While the *Chatfield* process was viewed as a "method of operating computing machines . . . employing particular algorithms," the *Waldbaum* process was itself identified with the mathematical problem solving algorithm.¹²³ The *Waldbaum* claims bore resemblance to those in *Christensen* in that both methods produced a number as a final result. *Waldbaum* served to show that simply limiting claims so as not to preclude other uses of the algorithm and wording the algorithm in machine language would not help the inventor avoid the *Christensen* rationale if claims were "directed to a calculation."

The applicant in *In re Flook*,¹²⁴ however, distinguished his claims from those in *Christensen*. Unlike *Christensen*'s, *Flook*'s method recited post-solution activity that applied the result of the calculation to a specific end use.¹²⁵ The court reasoned, therefore, that the patentability of *Flook*'s method was not controlled by that case and that the sole

119. As explained by the court:

Each data word is composed of a plurality of bits (binary digits). Each bit has two output conditions, one of which, for our purposes, is labeled 0 and the other of which, for our purposes, is labeled 1. The method controls the data processor to determine the number of bits in the 1 condition and the 0 condition.

Id. at 612 n.2. See also note 22 *supra*.

120. The claims in this group were prefaced with the following language: "In the data processor of a processor-controlled telephone switching system." *Id.* at 616 n.6.

121. *Id.* at 616-17.

122. *Id.* at 617.

123. *Id.* at 616.

124. 559 F.2d 21 (C.C.P.A. 1977), *rev'd sub nom.* *Parker v. Flook*, 437 U.S. 584 (1978).

125. The method is described at note 29 *supra*. The actual wording of the claim considered is as follows:

question remaining was whether the method was unpatentable under *Benson* itself.¹²⁶ Because mere solution of the algorithm would not infringe a patent issued on the *Flook* method, there would be no total preemption of the algorithm if a patent was issued on the process as claimed.¹²⁷ The court, however, neither mentioned nor discussed the week-old decision of *Waldbaum* and thus skirted the issue of whether the *Flook* method was essentially "directed to a calculation" even though the last step of the method applied the solution to a specific end use.

The court did deal with that issue in *In re de Castelet*.¹²⁸ The claims in that case described a "method of generating a curve or family of curves, employing a computer in conjunction with drafting and milling machines."¹²⁹ The curve generation was achieved through a computer programmed to perform certain calculations upon stored and incoming data, but the last step of the method was the transmittal of the electrical signals representing the curve to a "model forming means."¹³⁰ The court found the method, considered as a whole, to be a method of calculation and thus unpatentable subject matter.¹³¹ The court stated that a method was not necessarily unpatentable if it merely used a mathematical algorithm, but also indicated that not all post-solution activity would allow a method to escape being characterized as a method of calculation.¹³² The decisive factor was whether the

1. A method for updating the value of at least one alarm limit on at least one process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons wherein said alarm limit has a current value of

$$B_0 + K$$

wherein B_0 is the current alarm base and K is a predetermined alarm offset which comprises:

- (1) Determining the present value of said process variable, said present value being defined as PVL;
- (2) determining a new alarm base B_1 , using the following equation:
$$B_1 = B_0(1.0 - F) + PVL(F)$$
where F is a predetermined number greater than zero and less than 1.0;
- (3) determining an updated alarm limit value which is defined as $B_1 + K$; and, thereafter
- (4) adjusting said alarm limit to said updated alarm limit value.

Id. at 22.

126. *Id.* at 23.

127. *Id.*

128. 562 F.2d 1236 (C.C.P.A. 1977).

129. *Id.* at 1238.

130. *Id.* at 1239.

131. *Id.* at 1244.

132. That the computer is instructed to transmit electrical signals, representing the results of its calculations, does not constitute the type of post-solution activity found in *Flook* . . . and does not transform the claim into one for a process merely using an

claimed method was "essentially a mathematical calculation."¹³³ The court further noted that the post-solution activity of the *Flook* invention established that "the claimed method involved simply the use of an algorithm, and the claim was not in effect a claim to the algorithm per se."¹³⁴ The difference in the post-solution activity in *Flook* and *de Castelet* was that *de Castelet* had failed to describe enough post-solution activity to prevent the "application" of the algorithm from being a mere reformulation of the solution.¹³⁵

The *de Castelet* opinion greatly clarified the CCPA's interpretation of the holding in *Benson*. It had long been held that, while a scientific principle, or the mathematical expression thereof, was not patentable, the application of such a principle was patentable subject matter.¹³⁶ The question in *Benson* was whether there existed such an application. Although it is true that an inventor may not claim a mere "effect," as was attempted in *Morse*, the *de Castelet* court noted that the nonexistence of unclaimed alternative applications of the principle cannot possibly be determinative. If this were so, an inventor who first discovered a practical use for a scientific principle could not obtain a patent until at least one other application of the principle was discovered, and the public would have to wait until that time for a disclosure of the inventor's initial discovery.¹³⁷ Therefore, the CCPA concluded that the holding in *Benson* must have been simply that the application of an algorithm in a computer is not a sufficient application to raise the algorithm to the status of a patentable process.¹³⁸ Post-solution activity such as that found in *Flook*, however, could qualify as sufficient application, provided that it was more than a mere reformulation of the solution, and provided that the claim did not totally preempt the algorithm.

algorithm. The final transmitting step constitutes nothing more than reading out the result of the calculations. Recitations of specific machine elements, i.e., the mere reference in the claims to a computer and model-former, cannot alone render statutory the presently claimed subject matter as a whole.

Id. (emphasis in original).

133. *Id.* at 1243 (citing *In re Richman*, 563 F.2d 1026, 1027 (C.C.P.A. 1977)).

134. *Id.* (emphasis in original).

135. "The final transmitting step constitutes nothing more than reading out the result of the calculations." *Id.* at 1244.

136. See, e.g., *MacKay Radio & Tel. Co. v. Radio Corp. of America*, 306 U.S. 86 (1939). In *MacKay*, RCA owned a patent on a particular antenna structure having a relationship of elements conforming to a mathematical formula. The Court indicated that the formula itself was not patentable, but its use in describing the new and useful antenna did not render the claim invalid.

137. 562 F.2d at 1242-43 (relying on *The Telephone Cases*, 126 U.S. 1, 534-35 (1887)).

138. *Id.* at 1243.

In re Richman,¹³⁹ decided on the same day as *de Castelet*, involved another invention found to be directed to a method of calculation. The opinion also clarified and reaffirmed the CCPA's stance against the "point of novelty" approach.¹⁴⁰ The methods considered involved new mathematical formulae for calculating an average boresight correction angle for airborne, signal processing radar and for calculating the average vertical velocity component of the aircraft carrying the radar.¹⁴¹ The inventor argued that his method, unlike the one in *Christensen*, involved new methods of data collection as well as a new method of calculation. The court, however, viewed the data gathering steps to be dictated by the method of calculation; they were, in effect, merely part of the method of calculation.¹⁴² Thus, their novelty, or lack thereof, would not affect the subject matter patentability of the process.¹⁴³ Unlike those in *Chatfield*, *Deutsch* and *Flook*, the claims in *Richman* recited no post-solution activity in the "technological arts." The method was, therefore, "essentially a mathematical calculation," and unpatentable under *Christensen*.¹⁴⁴

The principles for determining subject matter patentability as described in the cases discussed above may be summarized with the following rules:

- I. A mathematical algorithm, like a mathematical formula, does not constitute a patentable process.¹⁴⁵
- II. A process is unpatentable if a patent thereon would be, in practical effect, a patent on a mathematical formula or algorithm.¹⁴⁶
- III. The process claimed is judged as a whole when determining subject matter patentability; even if an algorithm constitutes the only novel element within a process, this does not in itself bring that method under rule II above.¹⁴⁷
- IV. Limitation of the area of monopoly sought by the claims does not, in itself, take the process out of rule II

139. 563 F.2d 1026 (C.C.P.A. 1977).

140. *Id.* at 1029-30; see notes 111 & 113 and accompanying text *supra*.

141. 563 F.2d at 1027.

142. *Id.* at 1030.

143. *Id.*

144. *Id.*

145. *Gottschalk v. Benson*, 409 U.S. 63 (1972).

146. *Id.*

147. *E.g., In re Chatfield*, 545 F.2d 152 (C.C.P.A. 1976), *cert. denied*, 434 U.S. 875 (1977).

above.¹⁴⁸

- V. A process that is essentially a mathematical calculation, or directed to a method of calculating, is unpatentable subject matter.¹⁴⁹
- VI. A process that "merely uses" a mathematical algorithm toward an end in a "technological field" may constitute an application of the algorithm and thus be patentable subject matter.¹⁵⁰
- VII. Post-algorithm solution activity in a "technological field" may not be sufficient to bring a process under rule VI above if such activity is merely a reformulation of the solution to the algorithm.¹⁵¹

III. THE EFFECT OF *PARKER V. FLOOK*

The Supreme Court endorsed most of the above principles in *Parker v. Flook*.¹⁵² The Court quoted passages from *Gottschalk v. Benson* indicating that the approach to the issue of subject matter patentability would be taken in a manner corresponding to rules I and II above.¹⁵³ The Court also adopted the principles inherent in rules IV¹⁵⁴ and V¹⁵⁵ and, in name at least, approved of rule III.¹⁵⁶ On the other hand, while admitting that a process was not unpatentable simply because it contained an algorithm,¹⁵⁷ the Supreme Court did not adopt the "mere use" approach of the CCPA embodied in rules VI and VII. The Court found that focusing on the existence of post-solution activity

148. *E.g.*, *In re Waldbaum*, 559 F.2d 611 (C.C.P.A. 1977).

149. *E.g.*, *In re de Castelet*, 562 F.2d 1236 (C.C.P.A. 1977); *In re Waldbaum*, 559 F.2d 611 (C.C.P.A. 1977).

150. *See In re de Castelet*, 562 F.2d 1236 (C.C.P.A. 1977); *cf. In re Musgrave*, 431 F.2d 882 (C.C.P.A. 1970) (process must be in "technological field").

151. *In re de Castelet*, 562 F.2d 1236 (C.C.P.A. 1977).

152. 437 U.S. 584 (1978).

153. The Court quoted the "nutshell" passage from *Benson* that appears in note 88 *supra*. 437 U.S. at 589.

154. "He [Flook] does not seek to 'wholly pre-empt the mathematical formula,' since there are uses of his formula . . . that remain in the public domain. And he argues that the presence of specific 'post-solution' activity . . . distinguishes this case from *Benson* . . . We cannot agree." *Id.* at 589-90.

155. "As the Court of Customs and Patent Appeals has explained, 'if a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory.'" *Id.* at 595 (quoting *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977)).

156. 437 U.S. at 590; *see text* accompanying notes 172-77 *infra*.

157. "[I]t is . . . clear that a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm." 437 U.S. at 590.

without regard to its conventionality or obviousness "exalts form over substance" because a competent draftsman could attach some form of post-solution activity to almost any mathematical algorithm.¹⁵⁸ Flook's method was thus deemed nonstatutory subject matter under the *Benson* rationale—a patent on the method would have been, in effect, a patent on the algorithm itself.¹⁵⁹

The Court attempted to replace the "mere use" test of the CCPA with what may be called the "inventive application" test: a process containing a mathematical algorithm is patentable only if, aside from the algorithm itself, there is some inventive concept in the application of the algorithm;¹⁶⁰ the algorithm itself must be considered to be in the prior art.¹⁶¹ In response to the argument that the "inventiveness" requirement is a consideration of sections 102 (novelty) and 103 (nonobviousness) of the Patent Act and is not properly a consideration of section 101, the Court indicated that the objective of the announced test was to determine "what type of discovery is sought to be patented," not "whether that discovery is, in fact, new or obvious."¹⁶² While this reasoning coincides with the view that Flook's method was unpatentable because the claims sought, in effect, "a patent on the algorithm," it does not parry the charge that the concepts of novelty and obviousness have been imported into a section 101 test for subject matter. The *Flook* method failed to constitute statutory subject matter precisely because all of its constituent elements except for the algorithm were old.¹⁶³ Thus, subject matter patentability was found lacking at least partially because there was a lack of novelty in a portion of the invention.

158. *Id.*

159. *Id.* at 589, quoted at note 154 *supra*.

160. "Even though a phenomenon of nature or mathematical formula may be well known, an inventive application of the principle may be patented. Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application." 437 U.S. at 594.

161. In order to hold that the novel algorithm itself could not qualify as the inventive concept, the Court relied on a passage from an 1844 English patent case, *Neilson v. Harford*:

"It is very difficult to distinguish it [the Neilson patent] from the specification of a patent for a principle, and this at first created in the minds of the court much difficulty; but after full consideration we think that the plaintiff does not merely claim a principle, but a machine, embodying a principle, and a very valuable one. *We think the case must be considered as if the principle being well known, the plaintiff had first invented a mode of applying it . . .*" We think this case must also be considered as if the principle or mathematical formula were well known.

Id. at 592 (quoting *Neilson v. Harford*, Reports and Notes of Cases on Letters Patent for Invention 295, 371 (Ex. 1844) (emphasis in *Flook*)).

162. 437 U.S. at 593.

163. *Id.* at 593-94, quoted at note 178 *infra*. The Court dissected Flook's invention into its various components and noted that each element was well known except for the formula.

Section 101 may be construed as requiring novelty and inventiveness in the subject matter sought to be patented.¹⁶⁴ But, while some observers of the patent system have assumed these considerations to fall within section 101,¹⁶⁵ the CCPA is opposed to this view.¹⁶⁶ Members of the CCPA have consistently stated that subject matter patentability is entirely separate from the considerations of novelty under section 102¹⁶⁷ and that the judge-made concept of "invention" was entirely replaced by the requirement of "nonobviousness," separately applied under section 103.¹⁶⁸ The Supreme Court did not discuss either of these contentions. The latest decision cited to support the requirement of "inventive application" for patentable subject matter was the 1948 case of *Funk Bros. Seed Co. v. Kalo Inoculant Co.*¹⁶⁹ The issue in that case was whether a product consisting of a combination of naturally occurring bacteria was patentable. The Court found that the discovery of the natural quality of certain bacteria in combination was not patentable subject matter because it was a phenomenon of nature. The holding of the case, however, seemed to be that the *application* of the discovery embodied in the product was unpatentable because there was a lack of "invention."¹⁷⁰ Had the 1952 Patent Act applied to that case,

164. The section contains both the word "new" and "invents." See note 9 *supra*.

165. See Edwards, *That Clumsy Word "Nonobviousness!"*, 60 J. PAT. OFF. SOC'Y 3, 8 (1978); Comment, *supra* note 96, at 509 & n.63.

166. See Rich, *Escaping the Tyranny of Words—Is Evolution in Legal Thinking Impossible?*, 60 J. PAT. OFF. SOC'Y 271 (1978).

167. "Considerations of novelty or obviousness are of no effect whatever in determining whether particular claims define statutory subject matter under 35 U.S.C. § 101." *In re Freeman*, 573 F.2d 1237, 1243 n.2 (C.C.P.A. 1978).

168. See *Nickola v. Peterson*, 580 F.2d 879, 909 n.20, (6th Cir. 1978) (Markey, C.J., C.C.P.A., sitting by designation); Rich, *supra* note 166. Both Chief Judge Markey and Judge Rich of the CCPA outline the history of the "invention" requirement and argue that it was the intent of Congress to completely replace the vague, judge-made "invention" requirement with section 103 of the 1952 Patent Act. They also argue that the Supreme Court endorsed this reasoning in the case of *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

The "invention" requirement was first set forth in the case of *Hotchkiss v. Greenwood*, 52 U.S. (11 How.) 248 (1850). It became the third requirement of patentability; novelty and utility were required by statute. Although sometimes referred to as the degree or quantum of novelty required for patentability, the concept also included other factors, such as the quantum of utility provided by the new device or process. Various courts handled the concept in different ways and a number of inconsistently applied rules became associated with the requirement. See P. ROSENBERG, *supra* note 9, at 115-19. Section 103 of the 1952 Patent Act was added in an attempt to clarify the situation, but it is unclear whether the congressional intent was to completely replace the invention requirement along with all the rules that had become associated with the requirement. The Supreme Court in *John Deere* referred to § 103 as a codification of prior law. 383 U.S. at 17. The Court has also recently used concepts associated with the invention requirement in making § 103 determinations. See *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976) ("synergism" required).

169. 333 U.S. 127 (1948), cited at 437 U.S. at 591.

170. Compare the language in *Funk Bros.*:

section 103 would have entered into the discussion rather than the "invention" requirement and the product could have been found obvious. The viability of the "invention" requirement still remains unsettled; however, if the Court in *Flook* did mean that the old, judge-made invention requirement is required for subject matter patentability, it has resurrected a doctrine that the CCPA has long considered to be dead.¹⁷¹

Another important aspect of the *Flook* opinion is its treatment of the "point of novelty" approach. The Court, by reference to a quotation from *In re Chatfield*, apparently agreed with the CCPA that claims should be considered as a whole and not dissected into component parts and rejected as nonstatutory if the only novel component is itself nonstatutory.¹⁷² Once the algorithm is assumed to be within the prior art, the application is to be considered as a whole.¹⁷³ A question arises, however, as to how much this really means. Given that an *inventive* application is required for subject matter patentability, some inquiry must be made into the novelty and obviousness of the invention. If the algorithm must first be separated and considered to be within the prior art, it would seem impossible to make a judgment on the invention considered as a whole. Furthermore, if the only novel element of the claimed process is an algorithm or mathematical formula, there can be no novelty or inventiveness in the application, and the process will be nonstatutory. Thus, the inventive application test produces the same results as did rule two of *Abrams*, and the arguments of the CCPA in *Bernhart*, *Musgrave* and *Chatfield* rejecting that rule must apply with the same force to the new Supreme Court test.¹⁷⁴ Although the Court

The application of this newly-discovered natural principle to the problem of packaging of inoculants may well have been an important commercial advance. But once nature's secret of the non-inhibitive quality of certain strains of the species of *Rhizobium* was discovered, the state of the art made the production of a mixed inoculant a simple step. *Even though it may have been the product of skill, it certainly was not the product of invention.*

Id. at 132 (emphasis added), with 35 U.S.C. § 103, quoted in part at note 38 *supra* (nonobviousness requirement).

171. "The old judge-made requirement for 'invention' is not alive and well in all the federal courts . . . It is as dead as the dodo in the CCPA . . ." Rich, *supra* note 166, at 302-03.

172. 437 U.S. at 595 & n.16.

173. "Respondent's process is unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention." *Id.* at 595.

174. For example, the argument in *Bernhart* and *Chatfield* is that it is irrelevant how the novelty of an invention is expressed when determining subject matter. Section 101 simply states that "processes" and "machines" are to be statutory subject matter. It seems irrelevant to that determination whether the inventor chooses to express the *novelty* of the process in a mathematical formula or in some nonmathematical form. The inventive application test, however, would ex-

adopted the broad language found in *Chatfield*—that the claims must be considered as a whole—it, in effect, adopted the point of novelty approach that the *Chatfield* opinion was directed against.

A possible indication of what the Court meant by the statement that claims should be considered as a whole is offered by the Court's reference to section 103.¹⁷⁵ The nonobviousness requirement of that section means that advancement over prior art must be judged by considering the total combination of factors contributing "inventiveness" to the subject matter.¹⁷⁶ The statement by the *Flook* Court that a patent claim must be considered as a whole when judging subject matter patentability apparently means only that, once the advancement of the art contributed by the algorithm is subtracted, the search for an inventive concept in its application will proceed on the same grounds as would a check for nonobviousness under section 103. This procedure, however, could not be allowed in a section 103 test because of the requirement that obviousness must be determined as of the time the invention is made.¹⁷⁷ Thus, in a section 103 test, if *Flook's* algorithm was not obvious when the process was invented, it should not be considered to be within the prior art.

clude from statutory subject matter any process, the novelty of which was expressed solely in mathematical terms. See note 69 and accompanying text *supra*. Similarly, the argument in *Musgrave* is that the state of the art is immaterial to the question whether a process in that field is or is not statutory subject matter. See note 73 and accompanying text *supra*. Under the Supreme Court's test a process would be statutory when the application of the algorithm was novel, but a similar invention involving a new algorithm would be nonstatutory once the application became well-known. These considerations seem to belong more in sections 102 and 103 than in a determination of proper subject matter. See also text accompanying notes 216-20 *infra*.

175. "Section 103, by its own terms, requires that a determination of obviousness be made by considering 'the subject matter as a whole . . . Although this does not necessarily require that analysis of what is patentable *subject matter* under § 101 proceed on the same basis, we agree that it should." *Id.* at 594 n.16 (emphasis in original).

176. See P. ROSENBERG, *supra* note 9, at 122. The test for nonobviousness should include an examination of the entire picture, including such factors as, the relation between advantage or utility attained and the means selected for effecting same, the motivation for the change as well as the change itself, obstacles (real or apparent) existing in the art, and the source of the problem as well as the solution. What at first blush may appear obvious may be demonstrated to be, in fact, unobvious.

Id. One way of proceeding under this approach is first to judge the obviousness of each point of novelty in the invention. If each advancement over the prior art, considered one by one, is obvious, then a case of *prima facie* obviousness has been made. The inventor may then attempt to rebut the determination of *prima facie* obviousness by showing his invention to be nonobvious when considered as a whole using the factors in the quotation above. *Id.* Thus a process consisting of a number of steps, each being in itself old, may, nonetheless, be patentable because of a new order in which the steps are used, and an "unexpected result" occurring when the steps are used in that order. *Id.* at 73, 122.

177. 35 U.S.C. § 103 (1976) quoted in part at note 38 *supra*. There are minor exceptions to this requirement not here relevant. See P. ROSENBERG, *supra* note 9, at 240.

It is not clear how much "inventiveness" is required for an inventive application; the only hint given by the Court is that Flook's application was clearly noninventive because all components of the process, except the algorithm, were well known.¹⁷⁸ It is reasonable to assume that an inventive application simply means a novel and nonobvious application. If this is the meaning of the inventive application test, the Court has created an inventiveness requirement for processes including algorithms that is even more restrictive than a section 103 test, and it has made this test part of a section 101 test for statutory subject matter.

The thrust of the *Flook* opinion is clear: mathematical algorithms, no matter how new and useful, are not patentable subject matter; they should not, therefore, be transformed into patentable subject matter through the simple expedient of claiming them within a conventional, noninventive application. CCPA opinions written after *Flook* have embraced the first concept, but not the second. In *In re Sarker*,¹⁷⁹ the CCPA was presented with a situation much like the ones in *Christensen* and *Richman*. The method under consideration was a technique for mathematically modeling an open channel, such as a stream or artificial waterway, using apparently novel mathematical equations and certain data-gathering steps that the inventor also alleged to be novel.¹⁸⁰ Although the court noted that the novelty of the data-gathering steps would make no difference under the holding in *Richman*,¹⁸¹ it chose to decide the case on the basis of *Christensen* by finding, based on the inventor's admissions, that the data-gathering steps were old.¹⁸² The most interesting aspect of the case was the court's treatment of the inventor's argument that the *Flook* opinion supported his case.

Sarker asserts that [the data gathering step] is novel (because his algorithm makes it operative) and nonobvious. Sarker says that

178. Here it is absolutely clear that respondent's application contains no claim of patentable invention. The chemical processes involved in catalytic conversion of hydrocarbons are well known, as are the practice of monitoring the chemical process variables, the use of alarm limits to trigger alarms, the notion that alarm limit values must be recomputed and readjusted, and the use of computers for "automatic monitoring-alarming."

437 U.S. at 594 (footnote omitted).

179. 588 F.2d 1330 (C.C.P.A. 1978).

180. *Id.* at 1330-31, 1334. The inventor also claimed a method of locating an "obstruction" (e.g., a bridge or dam) in an open channel by use of the method. This would have called for discussion of post-solution activity and its relationship to § 101, but the inventor did not orally argue the issue of post-solution activity on appeal, and the CCPA felt it unnecessary to consider it. *Id.* at 1331, 1332 n.6.

181. *Id.* at 1336 n.18; see text accompanying notes 139-142 *supra*.

182. *Id.* at 1334-36; see text accompanying notes 97-102 *supra*.

makes his invention an "inventive application" of the algorithm, citing this from the majority opinion in *Parker v. Flook*

Beyond the irrelevance of novelty and nonobviousness considerations to determinations under § 101, Sarker's difficulty is that [the data gathering step], to the extent that it be considered novel, derives such "novelty" solely from the algorithm itself.¹⁸³

This passage was the only substantive treatment of the *Flook* opinion in *Sarker*. It produces the same results as does *Richman*—if the algorithm dictates the data gathering steps, the novelty of those steps will be of no consequence. Along with other portions of the *Sarker* opinion, this quotation clearly indicates the CCPA's reluctance to import the concepts of novelty and nonobviousness into a section 101 determination,¹⁸⁴ and its absolute refusal to revive the "invention" requirement.¹⁸⁵

The CCPA's initial approach to the *Flook* opinion seemed to be an attempt, by careful interpretation, to narrow that decision to its very facts. The court was presented with an opportunity to employ the inventive application test in the case of *In re Johnson*.¹⁸⁶ Several methods were involved in that case, all of which consisted of new procedures for removing undesired "noise" components from seismic data recorded as a function of time on a seismic trace as part of a conventional method of geoprospecting.¹⁸⁷ All of the procedures employed the steps of comparing waveforms produced by seismic detectors in order to determine the similarity of the waveforms, using this information to filter

183. *Id.* at 1335-36 (footnote omitted). The court quoted the "inventive application" language from *Flook*, quoted at note 160 *supra*, and in explanation of that passage noted that, "[P]atent law is statutory. Hence the word 'inventive' must be read as meaning 'novel and nonobvious.'"

184. Considerations of novelty and nonobviousness have no place in evaluations under § 101 as to whether an invention is within the categories of possibly patentable inventions. These considerations arise, as the statute makes plain, under §§ 102 and 103, respectively. Cognitive dissonance arises from references to "novelty," or to "patentability," in reviewing a rejection under § 101. If the subject matter as claimed is subject to patenting, *i.e.*, if it falls within § 101, it must then be examined for compliance with §§ 102 and 103. Absent such examination (or admissions), no record basis exists for determination or discussion of novelty, nonobviousness, or ultimate patentability.

Id. at 1333-34 n.10 (citation omitted).

185. A § 101 determination is concerned (setting aside utility) only with whether the claimed invention is within the categories there broadly enumerated. Since the 1952 Patent Act, and especially since *Graham v. John Deere Co.*, . . . it has been clear that a § 101 determination in no way involves consideration of the existence of "invention," if it ever did. The words "whoever invents" in § 101 are used in the sense of "whoever originates," patentability of the thing originated being dependent, as § 101 states, on its meeting the "requirements of this title."

Id. at 1334 n.10 (citation omitted).

186. 589 F.2d 1070 (C.C.P.A. 1978).

187. *Id.* at 1070-75.

out undesired portions of the trace corresponding to noise, and then producing a new, noiseless trace. The court's analysis of the claims based on *Flook* consisted of making two distinctions between the *Johnson* and *Flook* claims. The first distinction was that the *Flook* claim "recited a novel mathematical procedure for computing a number called an alarm limit," but the *Johnson* claims alleged "no such novel mathematical procedures and [did] not seek a patent on a mathematical formula."¹⁸⁸ The last phrase is clearly conclusory and offers no aid in analysis. That the *Johnson* inventors alleged no novelty in their mathematical formulae, on the other hand, is relevant; it automatically removes *Johnson* from the first portion of the inventive application test. Unlike the *Flook* claim, the *Johnson* claims were alleged not to depend solely on mathematical formulae for their novelty. The court did not, however, go on to ask if there was an inventive application of the formulae, but rather made a further factual distinction of *Flook* based on the end use of the process. The *Flook* method was again stated to have as its end purpose the computation of numerical values, while the *Johnson* methods were said to have the end purpose of filtering out extraneous and erroneous components of a seismic trace and physically recording a new, noiseless trace on a "record medium."¹⁸⁹ The court went on to state that "the significant limitations recited in the claims of operating on a recorded, unenhanced, seismic trace to produce and record a new seismic trace lead us to find the claims to recite statutory processes and not methods of calculating as were present in *Flook*."¹⁹⁰

The court was obviously suggesting that there was an application of the mathematical formulae in *Johnson* because it produced a new trace on a record medium, but that there was no such application of the algorithm in *Flook* because it produced only numbers. This finding is in direct contrast to the unanimous CCPA opinion in *In re Flook*, which stated that the method was "a process for controlling at least one parameter of a hydrocarbon conversion process,"¹⁹¹ and that "these claims include a recitation of post-solution activity, a step in which the solution is applied to a control system."¹⁹² If the second distinction in *Johnson* is controlling, as it is suggested to be, even in cases in which an algorithm contributes to the novelty of the claim, the court, in effect, interpreted the holding in *Flook* to be a mere overruling of the CCPA

188. *Id.* at 1078.

189. *Id.*

190. *Id.*

191. 559 F.2d at 23.

192. *Id.*

on the question whether sufficient post-solution activity was present in that case. That is, the *Flook* method would be more properly classed with those in the *de Castelet* and *Waldbaum* cases, in which there was little or no post-solution activity and the patent sought was, in effect, for the algorithm itself, than with those in *Chatfield* and *Deutsch*, in which the algorithm was applied in post-solution activity to some larger process. It is clear, however, that this was not the intent of the Supreme Court in *Flook*. The focus of the opinion was not on the quantity of post-solution activity, but on the conventionality of the method. Although the Court did state that "[a]n 'alarm limit' is a number,"¹⁹³ it also mentioned the conventionality of the process of "automatic monitoring-alarming"¹⁹⁴ and the presence of "'post-solution' activity."¹⁹⁵ Indeed, the very issue of the *Flook* case, as phrased by the Court, was "whether the identification of a limited category of useful, *though conventional*, post-solution applications of . . . [a novel and useful mathematical] formula makes respondent's method eligible for patent protection."¹⁹⁶

The rather strained interpretation of *Flook* that was foreshadowed in *Johnson* was confirmed in *In re Diehr*.¹⁹⁷ Asserting that the court's view was "not in any way inconsistent" with the precedents set by the Supreme Court in *Benson* and *Flook*,¹⁹⁸ the CCPA summarily dismissed the inventive application test set forth in *Flook* as being unnecessary to the holding in that case.¹⁹⁹ The holding of *Flook*, according to the CCPA, was simply that the *Flook* claims were "directed to methods of calculation,"²⁰⁰ and therefore "nonstatutory *regardless* of whether the equation was old or new."²⁰¹ Assuming the algorithm to

193. 437 U.S. 585.

194. *Id.* at 594.

195. *Id.* at 590.

196. *Id.* at 585 (emphasis added). The answer, of course, was that only an *inventive* application of such a formula could support a patent. *Id.* at 594, quoted at note 160 *supra*.

197. 602 F.2d 982 (C.C.P.A. 1979).

198. *Id.* at 985.

199. Although in *Flook* the Supreme Court assumed the equation of the claim to be old in the art even though it was not, the holding of that case does not depend on that mode of analysis. Since *Flook*'s claims were held to be directed to methods of calculation, they were nonstatutory *regardless* of whether the equation was new or old. While the Supreme Court in that case may have found that analysis a convenient vehicle to highlight the fact that *Flook*'s actual contribution to the useful arts was his new formula, we do not believe the Court meant to establish that analysis as a general test in determining compliance with § 101, especially when indiscriminately applied to claim limitations generally.

Id. at 987 n.6 (emphasis in original).

200. *Id.*

201. *Id.* (emphasis in original).

be in the prior art merely served as "a convenient vehicle to highlight the fact that Flook's actual contribution to the useful arts was his new formula," and was not meant to establish a general test for section 101.²⁰²

The invention under consideration in *Diehr* was a method for operating rubber-molding presses by using a computer to constantly incorporate changing temperature data and recompute the optimum time for opening the presses according to a well-known formula.²⁰³ Once the presence of the mathematical formula was acknowledged, the court found the test to be simply "whether the claim merely recites a mathematical formula or a method of calculation as in *Benson* and *Flook*."²⁰⁴ Following its approach in *Johnson*, the court distinguished the claimed invention from the one in *Flook* by asserting that the *Flook* claims recited nothing but a method of calculation "coupled with the post-solution activity consisting only of updating an alarm limit to the newly-calculated value which is merely a new number."²⁰⁵ In response to PTO assertions that the *Diehr* claims were also directed to an improved method of calculation, the court noted that "such a conclusion is only made possible by ignoring the fact that a molding press is recited and operates as the heart of the process."²⁰⁶ The saving feature of the *Diehr* claims was that they recited "a process involving the manipu-

202. *Id.*

203. A representative claim reads as follows:

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
 $\ln v = C Z + x$
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.

Id. at 983-84.

204. *Id.* at 988 (quoting *In re Johnson*, 589 F.2d at 1077).

205. *Id.* at 989.

206. *Id.* at 988.

lation of apparatus resulting in the chemical and physical change of starting material."²⁰⁷

Both the *Flook* and the *Diehr* methods involved a mathematical formula and repetitive calculations using continuous incoming data. Both methods also used the results of the calculations in an industrial process: the *Diehr* method used formula results to determine the optimum cure time for a rubber-molding process and the *Flook* method used the formula results to determine alarm limit values. The *Diehr* claims purported to describe "a method for operating a rubber-molding press"; after the optimum cure time elapsed the press automatically opened.²⁰⁸ The *Flook* claims were for a method of updating alarm limits in a process comprising the catalytic conversion of hydrocarbons;²⁰⁹ after the new alarm limit value was computed, the alarm limit was reset. The CCPA distinguished these claims by simply noting that the recitation of the molding process in the *Diehr* claims was more complete and detailed than the recitation of the catalytic conversion process in the *Flook* claims. The post-solution activity described in the *Diehr* claims (opening the press once the calculated time had elapsed) and the post-solution activity of the *Flook* claims (resetting the alarm limit in a catalytic conversion process once the new value was calculated) cannot be easily distinguished,²¹⁰ and the CCPA did not attempt to do so. This should not be interpreted, however, as a retreat from the requirement of post-solution activity set forth in *de Castelet*,²¹¹ but rather as a reaffirmation of rules set down before *de Castelet*. The CCPA will examine on a case-by-case basis not only the substance of the post-solution activity but also the pre-solution activity recited by a claim to determine whether the claim as a whole recites a process other than one that is essentially a calculation.²¹² Simply reciting that the method of calculation is claimed only when used within a specified technological process will not suffice to make the claimed method, as a whole, statutory, at least not where the recited post-solution activity is minimal as was the case in *Flook*.

The refusal of the CCPA to follow the *Flook* inventive application

207. *Id.*

208. *Id.* at 983, quoted at note 203 *supra*.

209. See note 125 *supra*.

210. Compare *id.* (*Flook* claim) with the *Diehr* claim quoted at note 203 *supra*.

211. See notes 128-38 and accompanying text *supra*.

212. See notes 114-23 and accompanying text *supra*. In accordance with *In re Richman*, data collection steps will be considered part of the calculation process. See text accompanying notes 141-43 *supra*.

test is understandable. The adoption of the inventive application test would have negated nearly all of the case law on program-related inventions built up by the CCPA since the initial rejection of the "point of novelty" approach in *Prater*.²¹³ The two principal objections to a requirement of inventive application were stated in *Bernhart*²¹⁴ and *Musgrave*,²¹⁵ and the court has depended on these precedents for at least ten years. The *Musgrave* argument is simply that the issue of proper subject matter should, for conceptual clarity, be decided before the issues of novelty and obviousness are considered.²¹⁶ If the issue of proper subject matter is not resolved first, the concept of patentable subject matter will be dependent on ultimate patentability and will be useless as a concept separate from that of ultimate patentability. Although this criticism could be avoided by applying the inventive application test within the section 103 test for nonobviousness, such a solution would require the courts to ignore the plain language of section 103, which states that obviousness must be determined as of the time the invention is made and that the invention must be considered as a whole.²¹⁷

Perhaps the more telling criticism of the inventive application test is the one originally stated in *Bernhart*. If a mathematical relationship within an invention is first assumed to be within the prior art and an *inventive application* of the mathematical relationship is further required, the inventor is disadvantaged when compared with an inventor who develops the same machine or process by trial and error and does not disclose the mathematical relationship upon which the invention is based.²¹⁸ Although it is true that the inventor using a mathematical

213. See text accompanying notes 42-63 *supra*.

214. See notes 66-70 and accompanying text *supra*.

215. See notes 72-74 and accompanying text *supra*.

216. See note 73 *supra*. For a post-*Flook* exposition of this argument, and an argument that it was the congressional purpose to separate the concepts, see *In re Bergy* (*Bergy II*) 596 F.2d 952, 959-64 (C.C.P.A.), *cert. granted sub nom. Parker v. Bergy*, 100 S. Ct. 261 (1979).

217. See text accompanying notes 173-78 *supra*.

218. For example, an inventor may seek to patent a certain configuration of electronic elements that produces totally new and previously unattainable results. The discovery may have been made by accident when the inventor mistakenly placed one component in contact with another, or it may have resulted from the inventor's new and more accurate theory of electronics, which utilizes new mathematical formulae. If a patent is allowed when the first discovery is made by accident, then a patent should also be allowed when the invention is the result of a new theory, and it should make no difference that the invention is described in terms of a new mathematical formula. If, however, the inventive application test is applied, and the entire novelty of the invention, as described in the claims, resides in the novel formula, a patent will not be granted. See also notes 69 & 174 *supra*.

The CCPA in *In re Bergy* (*Bergy II*), 596 F.2d 952 (C.C.P.A.), *cert. granted sub nom. Parker*

relationship to describe part of his invention is likely to totally preempt all presently known practical uses of the mathematical relationship, this cannot by itself serve as a rationale for denying patent protection if there is an application of the mathematical relationship to a practical problem. To require an inventive application in addition to a newly discovered mathematical relationship will encourage the inventor who knows only of conventional applications of his new discovery to keep the discovery secret.²¹⁹ If the invention is truly unworthy of a patent because, considered as a whole, it is obvious, section 103 can be used to prevent a patent from issuing. The inventive application test, however, would be inappropriate in a section 103 test for the reason stated in *In re Bernhart*. Once an inventor makes a new discovery, the application of that new discovery to a practical problem may be obvious. Although the discovery may not itself be patentable, it is a long-standing rule of patent law that the discovery itself will not be held against the inventor in determining the obviousness of his invention.²²⁰

Although both of these objections were raised in respondent's brief in *Flook*, the opinion in *Flook* failed to adequately answer the first or even address the second. Given the importance of the principles involved, the CCPA cannot be blamed for its recalcitrant attitude toward *Flook*.

v. Bergy, 100 S. Ct. 261 (1979), discussed this troublesome feature of the Supreme Court's holding in *Flook*:

Another principle stated in *Flook* is that a 'mathematical algorithm' or formula is like a law of nature in that it is one of the 'basic tools of scientific and technological work' and as such must be deemed to be a "familiar part of the prior art," even when it was not familiar, was not prior, was discovered by the applicant for patent, was novel at the time he discovered it and was useful. This gives to the term 'prior art', which is a very important term of art in patent law, particularly in the application of § 103, an entirely new dimension with consequences of unforeseeable magnitude.

.....
Insofar as the general patent law is concerned . . . the above-stated novel *Flook* doctrine may have an unintended impact in putting an untimely and unjustifiable end to the long-standing proposition of law that patentability may be predicated on discovering the cause of a problem even though, once that cause is known, the solution is brought about by obvious means. Such causes may often be classed as laws of nature or their effects The potential for great harm to the incentives of the patent system is apparent.

It is one thing to say that a principle, natural cause, or formula, *per se* is not within the categories of § 101, but quite another to say it is 'prior art' in determining the nonobviousness of an invention predicated on it even though the inventor discovered it.

Id. at 965-66 (emphasis in original).

219. See text accompanying notes 136-38 *supra*.

220. See note 218 *supra*. Once the law of nature or scientific principle upon which the invention is based is explained, there remains very little mystery about the invention. Although the discovery of the principle is not patentable, the application of the principle is patentable. If the discovery, however, were to be considered known in the prior art, the application of the discovery would often seem to be obvious.

IV. CLAIMS NOT RECITING AN ALGORITHM

It must be noted that, because the *Benson* and *Flook* opinions were limited to processes including *mathematical* algorithms, many program-related inventions escape analysis under these opinions simply because they do not contain such algorithms. For example, *In re Freeman*,²²¹ a CCPA case decided before the Supreme Court's decision in *Flook*, involved program-related method and apparatus claims for a system of typesetting using a computer based control system in conjunction with a conventional phototypesetter.²²² The *Freeman* method contained a "step by step" procedure that could be classified as an algorithm in the general sense of the word.²²³ The CCPA, however, strictly limited the use of the term "algorithm" to the restricted meaning of the word found in *Benson*.²²⁴ The court admitted that a mathematical algorithm could be recited indirectly in prose as was done in *Waldbaum* and *de Castelet*, but found that no part of the *Freeman* claim recited steps that were equivalent to methods of calculations.²²⁵ In the specification the inventor did disclose a computer program that would perform the method,²²⁶ but the court stated that the conclusion that every implementation within a digital computer equals an algorithm in the *Benson* sense was "without basis in the law."²²⁷ Because no algorithm was found, the claims entirely escaped examination under the *Benson* line of cases, and the claims were held statutory.

Freeman illustrates the importance of the algorithm approach in dealing with computer program-related inventions. Had the wording of the *Freeman* claims at any step indicated the necessity of production of numerical values or operation upon mathematical concepts, an algorithm would have probably been found and the claims subjected to

221. 573 F.2d 1237 (C.C.P.A. 1978).

222. The method claims called for the assigning of "concatenation points" to each character to appear on the display device, specifying which concatenation points for adjacent characters should coincide, testing and modifying the spatial relationship between adjacent characters to provide for minimum clearance, and employing a hierarchical tree structure to establish the proper spatial relationships among the characters. *Id.* at 1238-40. The method was specially designed to place symbols of different sizes in positions subordinate or superior to one another as well as in the proper line or order. It was thus quite useful in the printing of mathematical formulae.

223. The inventor did refer to his method as employing a "local positioning algorithm." *Id.* at 1246.

224. See note 30 *supra*.

225. 573 F.2d at 1246.

226. *Id.* at 1242.

227. *Id.* at 1245. The CCPA continues to hold this view. See, e.g., *In re Phillips*, 203 U.S.P.Q. (BNA) 971 (C.C.P.A. Nov. 15, 1979).

the tests for patentable subject matter developed after *Benson*.²²⁸ It may be argued that this procedure is arbitrary in penalizing only those program-related inventions that employ mathematical concepts in their claims. Computer programs must ultimately direct electrical impulses through computer circuitry to solve problems. The internal workings of the computer are based on the principles of binary arithmetic and the performance of elementary mathematical and logical operations, so that, in the final analysis, the program must carry out its problem-solving activity through the solution of essentially mathematical problems.²²⁹ Therefore, a process that incorporates a computer program may be viewed as indirectly reciting mathematical problem-solving activity. The CCPA initially recognized that this argument could be made, but considered the factual questions involved to be improper for consideration by the court.²³⁰ In the case of *In re Bradley*,²³¹ however, the court did reach the issue and held that, when no solution to a mathematical problem is described in the claims, a computer's use of number representation in problem-solving activity does not in itself constitute arithmetic calculation sufficient to invoke *Benson* and *Flook*.²³²

228. See *In re Johnson*, 589 F.2d 1070, 1077 (C.C.P.A. 1978).

In re Gelnovatch, 595 F.2d 32 (C.C.P.A. 1979), demonstrated that a particular mathematical relationship between two or more values or defined variables need not be recited in order for claims to be subjected to the *Benson* and *Flook* analysis. The invention in *Gelnovatch* was essentially a computerized modeling method for testing and determining the necessary electrical qualities of components in microwave generation circuitry needed to produce microwaves of a given frequency. The court indicated that, although a similar method accomplishing the same end might be described without constituting a "method of calculation," the *Gelnovatch* method did employ mathematical values and operations to solve a mathematical problem and thus had to be examined under *Flook* and *Benson*. *Id.* at 41-42. Judge Markey dissented on the ground that the modeling system was not equivalent to a mathematical expression of a scientific principle or law of nature and, therefore, should not fall under the rationale of *Benson* and *Flook*. *Id.* at 42-48 (dissenting opinion).

229. See note 22 *supra*.

230. We do not consider the question whether the mere recitation of a step involving computer activity, but not otherwise reciting an algorithm, "indirectly recites" an algorithm. That issue was neither considered by the [Patent and Trademark Office Board of Appeals] nor argued before us. Furthermore, the question involves factual inquiries which an appellate court is ill-equipped to accomplish.

In re Toma, 575 F.2d 872, 877 n.7 (C.C.P.A. 1978) (holding program-related invention for translating natural languages statutory subject matter).

231. 600 F.2d 807, 811-12 (C.C.P.A. 1979), *petition for cert. filed sub nom. Diamond v. Bradley*, No. 79-855 (U.S. 1979), *reprinted in* PAT. T.M. & COPYRIGHT J., Dec. 13, 1979, at E-1.

232. The PTO estimates that it has pending over 1800 applications for program-related patents that do not incorporate mathematical algorithms. *Petition for Certiorari, Diamond v. Bradley*, No. 79-855 (U.S. 1979), *reprinted in* PAT. T.M. & COPYRIGHT J., Dec. 13, 1979, at E-1, E-4. In its petition for certiorari, the PTO argues that the rationale of *Benson* and *Flook* does not depend on the mathematical nature of the algorithm involved; nonmathematical algorithms are merely ideas or concepts and the common law has traditionally held ideas or concepts unpatentable

V. CONCLUSION

The *Sarker*, *Johnson* and *Diehr* decisions clearly outline the CCPA's position on program-related inventions after *Flook*. The *Flook* opinion has had little if any effect on the CCPA's approach to program-related inventions. The incorporation of a computer program will have no effect on the subject matter patentability of an invention unless a mathematical algorithm is also recited in the claim. A claim reciting an algorithm, but describing a process or apparatus in the technological arts, will still survive under the CCPA's interpretation of *Flook* unless the claim "as a whole is directed essentially to a method of calculation or mathematical formula."²³³ This determination will be made on a case-by-case basis, but the post-*Flook* cases indicate that the analysis will proceed according to guidelines created before the Supreme Court's decision in *Flook*. If a claim recites some post-solution activity and a fair amount of a technological process or apparatus that does not involve calculation, the conventionality of the recited process or apparatus will not defeat the subject matter patentability of the invention.²³⁴

The Patent and Trademark Office is not receptive to this interpretation of *Flook*.²³⁵ Deluged with applications for program-related pat-

whether or not they are expressed in mathematical form. Because all computer programs, in the final analysis, must be concerned solely with data that can be represented numerically, they must themselves be "abstract intellectual concepts," and, therefore, unpatentable. *Id.* at E-3 to E-4.

This argument goes too far. Most if not all process inventions begin as unpatentable ideas; applying the idea to improve a process within the technological arts allows the inventor to exclude others from using his idea in the claimed process. The Supreme Court in *Benson* determined that a method of calculation or algorithm, like an idea or scientific principle, was unpatentable and that application of the algorithm within a computer would not be sufficient application to transform the unpatentable algorithm into a technological process patentable under § 101. The rationale for the second part of the holding is not that computers fall outside the "technological arts"—computers are clearly within the technological arts. The *Benson* opinion emphasized that the only practical method of performing some calculations is by use of a computer, but as noted above, see notes 136-38 and accompanying text *supra*, this cannot be the rationale for the decision. The key to understanding *Benson* is noting that the method of calculation under consideration remained a method of calculation even when transposed into claims on certain computer activity. A nonmathematical idea, however, will not necessarily become a method of calculation when transposed into claims reciting computer activity. For example, a process for more efficiently operating a computing system would involve a computer program, but could be described in a nonmathematical manner. The idea for the process would be an "abstract intellectual concept," but the idea is applied to a problem in a technological field. It should not matter that the idea is for a more efficient method of conducting electrical impulses through circuits rather than, for example, a more efficient method of transporting materials in a manufacturing process. Cf. *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45 (1923) (process using force of gravity to speed printing process held patentable subject matter).

233. *In re Diehr*, 602 F.2d at 987.

234. See *id.* at 988-89.

235. The PTO has indicated that it will ask the Supreme Court to review the CCPA's decision

ents and lacking the administrative means to process them properly,²³⁶ the PTO seeks to use section 101 to exclude these inventions from patentability by using the threshold issue of subject matter patentability.²³⁷ The PTO has consistently argued, and will continue to argue, that *Parker v. Flook* actually called for a moratorium on program-related patents.²³⁸ Support for this view is obtained from the final portion of the *Flook* opinion in which the Court, speaking of program patents, warned that it was the duty of the Court to "proceed cautiously when . . . asked to extend patent rights into areas wholly unforeseen by Congress."²³⁹ The CCPA, however, responded to this argument in *Sarker* by pointing out that the patent system is designed to encourage technological breakthroughs and that Congress cannot be expected to amend the Patent Act annually to incorporate every breakthrough into "new technological terrain."²⁴⁰ The CCPA has undoubtedly taken the more reasonable side of this argument, and only the strongest words from the Supreme Court will cause it to turn from this position.²⁴¹

Aside from the administrative problems left to the PTO, the most unfortunate consequence of *Flook* and the post-*Flook* CCPA decisions is the likely confusion and fragmentation of opinion that will occur in federal courts deciding patent cases. Although the CCPA can effectively cause patents on program-related inventions to issue by overruling the PTO when the latter uses the inventive application test, the validity of these types of patents can also be challenged in other federal courts in infringement actions.²⁴² These courts will naturally look to the most recent Supreme Court decision, *Parker v. Flook*, which tells them to consider the algorithm to be part of the prior art and to look for an inventive application of the algorithm. If the interpretative opinions by the CCPA, the court most experienced in patent matters,

in *Diehr*. Petition for Certiorari, *Diamond v. Bradley*, No. 79-855 (U.S. 1979), reprinted in *PAT. T.M. & COPYRIGHT J.*, Dec. 13, 1979, at E-1, E-4.

236. See *id.*

237. See *In re Gelnovatch*, 595 F.2d 32, 42 (C.C.P.A. 1979) (Markey, J., dissenting).

238. See, e.g., Petition for Certiorari, *Diamond v. Bradley*, No. 79-855 (U.S. 1979), reprinted in *PAT. T.M. & COPYRIGHT J.*, Dec. 13, 1979, at E-1, E-4.

239. 437 U.S. at 596.

240. 588 F.2d at 1333.

241. See *In re Bergy* (*Bergy II*), 596 F.2d 952 (C.C.P.A.), cert. granted sub nom. *Parker v. Bergy*, 100 S. Ct. 261 (1979). The CCPA had previously approved the subject matter patentability of living organisms and was asked by the Supreme Court to reconsider this decision in light of what was said in *Parker v. Flook*. The CCPA, speaking through Judge Rich, marshalled several arguments against the narrow view of patentable subject matter delineated in *Flook* and refused to change its decision on the subject matter patentability of the living organisms. *Id.* at 987. The Supreme Court has again granted certiorari. 100 S. Ct. 261 (1979).

242. See 35 U.S.C. §§ 281-293 (1976); 28 U.S.C. 1338 (1976).

are not consistent with this Supreme Court opinion, even a semblance of uniformity among federal courts will be impossible.²⁴³ The predictable result of this process is exemplified by the continuing controversy over the requirement of "synergism," which has not been settled since the enactment of the 1952 Patent Act despite several decisions by the Supreme Court.²⁴⁴ The ultimate conclusion must be that yet another decision by the Supreme Court is needed to settle the issue of program-related patents and that, insofar as *Flook* was intended to clarify the area and to relieve pressure on the PTO, it was a dismal failure.

Neither the Supreme Court nor the CCPA is qualified to determine whether the patenting of program-related inventions will further the objectives of the Patent Act.²⁴⁵ The determination of this issue requires the use of empirical data beyond the reach of the courts and involves policy questions better suited to consideration by Congress.²⁴⁶ Unfortunately, Congress shows no signs of acting on the matter. Nevertheless, inventors of program-related inventions must choose between the mutually exclusive alternatives of patent and trade secret protection, and the courts must at least provide a consistent theoretical basis upon which inventors can rely in making this choice. The theoretical basis of *Flook* has little support in modern patent law; if applied to other areas of patent law, the consequences would be of an "unforeseeable magnitude."²⁴⁷ The CCPA's approach, on the other hand, does fit within accepted principles of modern patent law. If the CCPA's approach is adopted, however, the PTO will continue to receive more applications than it can properly process, and some inventions may be patented that do not comport with the purposes of the Patent Act. Because no court can properly resolve this policy issue, however, the theoretical basis used by the CCPA should be adopted by the Supreme Court,²⁴⁸ and the PTO should petition Congress for appropriate relief,

243. A recent Court of Claims decision employed the interpretation of *Flook* suggested by the CCPA. See *Arshal v. United States*, 202 U.S.P.Q. (BNA) 749, 760, (Ct. Cl. May 11, 1979).

244. See *Rich*, *supra* note 166, at 295-303. Compare *Herchensohn v. Hoffman*, 593 F.2d 893 (9th Cir.), *cert. denied*, 100 S. Ct. 84 (1979) ("synergism" required) with *AMP Inc. v. Bunker Ramo Corp.*, 604 F.2d 24 (7th Cir. 1979) ("synergism" not required). The requirement of "synergism" is a concept that is sometimes applied by courts to find an invention obvious. "Synergism" exists if a combination of old elements having known effects produces "an effect greater than the sum of the several effects taken separately." *Anderson's-Black Rock v. Pavement Salvage Co.*, 396 U.S. 57, 61 (1969).

245. See note 4 *supra*.

246. *Parker v. Flook*, 437 U.S. at 595.

247. *In re Bergy* (*Bergy II*), 596 F.2d 952, 965 (C.C.P.A.), *cert. granted sub nom. Parker v. Bergy*, 100 S. Ct. 261 (1979), *quoted at* note 218 *supra*.

248. On March 17, 1980, the Supreme Court granted petitions for certiorari by the Solicitor

either in the form of an increase in funds to process the applications generated by program-related inventions or a statutory exemption of such inventions from the protections afforded by the Patent Act.

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