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William L. Anthony, Jr.

Robert C. Colwell

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LITIGATING THE VALIDITY AND INFRINGEMENT OF SOFTWARE PATENTS

WILLIAM L. ANTHONY, JR.*
ROBERT C. COLWELL**

Much creative effort has been expended by Congress, state legislatures, and individual attorneys to create proprietary rights in computer programs. As a result, it is now established that computer programs can be protected by patent, copyright, and trade secret law.¹ While the focus of this article is on patent rights, and particularly, litigating the issues of validity and infringement of software patents, a broad overview of the various forms of software protection is presented to place patent protection in perspective. With that objective in mind, a brief comparison of copyright and trade secret protection with patent protection follows.²

I. A COMPARATIVE ANALYSIS OF PATENT PROTECTION AND OTHER FORMS OF PROTECTION OF COMPUTER PROGRAMS

A. *Patents*

1. Introduction

Patent protection is unique with respect to both the breadth of protection over a variety of different implementations of a patented program and the reach of the protection to a broad class of potential misappropriators. The advantages of patent protection of computer programs, however, are accompanied by several significant disadvantages. These disadvantages include the cost of obtaining the patent, the delay inherent in prosecuting the patent application to issue as a patent, and the stringent requirements of patentability faced in obtaining and enforcing the patent.

2. The Breadth of Patent Protection

The most important advantage of patent protection is the breadth of the protection provided. A patent on a computer program need not be limited

* Partner, Townsend and Townsend, San Francisco, California; B.S. (1961) Worcester Polytechnic Institute; J.D. (1966) University of Connecticut; registered to practice before the U.S. Patent and Trademark Office; member of Michigan and California Bars.

** Partner, Townsend and Townsend, Palo Alto, California; B.S. (1969), M.S. (1970) University of Kansas; J.D. (1973) Stanford University; registered to practice before the U.S. Patent and Trademark Office; member of California Bar.

1. Another form of software protection, yet undergoing definition, is contract law. Under contract theory, the end user of a software program, particularly a lessee or licensee, bargains away some of his rights to use the program; for example, the right to rent the software or use it on multiple CPUs. Such contractual bases for software protection are beyond the scope of this article.

2. For a more detailed discussion of copyright and trade secret protection of computer

to the manner of expression used by the programmer. Rather, the patent may protect the broad concepts or ideas embodied in the program. Patent protection is typically expressed in broad terms which describe the overall organization or function of a computer program.³ Ordinarily, the patent will not be limited to a specific implementation or specific instructional steps. No other form of protection of computer programs provides so comprehensive a proprietary right to the creator of the software.⁴

3. The Reach of Patent Protection

Patent protection reaches deeply into the marketplace. It is capable of providing relief against a broad class of potential misappropriators.⁵ No prior fiduciary or contractual relationship between the patent owner and the potential misappropriator is required. The potential misappropriator need not have

programs, see Root, *Protecting Computer Software in the '80's: Practical Guidelines for Evolving Needs*, 8 RUTGERS J.C. & T.L. 205 (1981).

3. See *Diamond v. Diehr*, 450 U.S. 175 (1981); *Matter of Application of Bradley*, 600 F.2d 807 (C.C.P.A. 1979), *aff'd*, 450 U.S. 381 (1981); *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358 (D. Del. 1983). The primary claim in *Matter of Application of Bradley* is illustrative of the broad terms in which patent claims are typically formed:

1. In a multiprogramming computer system having a main memory, a central processing unit (CPU) coupled to said main memory, said CPU controlling the state of a plurality of groups of processes being in a running, ready, wait or suspended state, said computer system also having scratchpad registers being accessible to an operating system for controlling said multiprogramming computer system, a data structure for storing coded signals for communicating between said processes and said operating system, and said scratchpad registers, said data structure comprising:

(a) first means in said data structure and communicating with said operating system for storing coded signals indicative of an address for a selected one of said processes;

(b) second means in said first means for storing coded signals indicating priority of said selected one of said processes in relation to others of said processes for obtaining control of said CPU when ready;

(c) third means in said data structure and communicating with said operating system, for storing coded signals indicative of an address for a selected one of said plurality of groups of processes; and

(d) fourth means coupled to said data structure and said scratchpad registers, for generating signals causing the changing of information in said data structure and said scratchpad registers.

600 F.2d at 809.

This claim is in "means plus function" format, a broad form of expression used to set forth the boundaries of the protection afforded by the patent. The "means plus function" format, for example, "second means ... for storing coded signals ...," is explicitly sanctioned by statute and is deemed to cover "the corresponding structure, material, or acts described in the specification and equivalents thereof." See 35 U.S.C. § 112 (1982).

4. See 35 U.S.C. § 154 (1982). The patent constitutes "... a grant to the patentee, his heirs or assigns, for the term of seventeen years ... of the right to exclude others from making, using, or selling the invention throughout the United States...." *Id.* (Emphasis added).

5. In addition to proscribing the making, using or selling of a claimed invention, the patent laws also prohibit the selling of certain components of a patented invention or the active inducement of an infringement. See *id.* §§ 271(a)-(c).

copied the program. In fact, the potential misappropriator may have designed his program entirely independently of the patent owner, and without any prior knowledge or notice of either the patent or the program protected by the patent.⁶

The scope of the patent owner's property right is measured by reference to the claims at the end of the patent. The patent is infringed if even one of the patent claims is broad enough to cover the program of the potential misappropriator.⁷ Of course, a patent must be found valid as well as infringed before a judgment against the misappropriator can be obtained.⁸

4. The Disadvantages of Patent Protection

Patent protection is not free of disadvantages. First, the drafting of the application, the prosecution of the application before the Patent and Trademark Office, and the government filing, issuance, and maintenance fees are each costly relative to other forms of protection.⁹ It is unlikely that the issued patent will be obtained for less than \$5,000, and for complex programs, the cost can exceed \$10,000. Second, and in many cases more importantly, a substantial delay prior to relief is inherent in the patent system. Because of the thorough examination required and the workload of the Patent Office, the issuance of a patent generally requires one to three years.¹⁰ With an extraordinary effort on the part of the applicant, accompanied by a showing of actual misappropriation of the invention, a patent may be issued in less than one year, but certainly not much less than one year.¹¹

After the patent is issued to the patent owner, he may for the first time bring suit on the patent.¹² In most cases, however, the courts will not provide quick relief. As a general rule, preliminary injunctions are not granted in patent cases unless the patent has been upheld in prior litigation or the patent has been widely recognized by the industry.¹³ Neither of these showings can be made in regard to newly issued patents. Accordingly, the patent owner cannot expect monetary or injunctive relief until after a full trial on the merits. Once the patent owner achieves victory at the trial level, his relief may be further

6. "It is, of course elementary, that an infringement may be entirely inadvertent and unintentional and without knowledge of the patent. In this respect the law of patents is entirely different from the law of copyright." *Blair v. Westinghouse Elec. Corp.*, 291 F. Supp. 664, 670 (D. D.C. 1968). See also *Kewanee Oil Co. v. Bicon Corp.*, 416 U.S. 470, 476, 478 (1974).

7. See 35 U.S.C. §§ 271(a)-(c) (1982).

8. See *id.* §§ 281-284.

9. See 37 C.F.R. §§ 1.16-1.21 (1984) (providing government filing, processing, issuance, post-issuance and other fees).

10. The *Official Gazette* of June 26, 1984, stated that for Patent Examining Group 230, a section of the Patent Office charged with examining information processing, storage, and retrieval inventions, the oldest application awaiting action had been filed September 24, 1981. See *OFF. GAZ. PAT. OFC.* 133 (June 26, 1984).

11. See 37 C.F.R. § 1.102 (1984).

12. See 35 U.S.C. § 281 (1982).

13. See *Carter-Wallace, Inc. v. Davis-Edwards Pharmacal Corp.*, 443 F.2d 867 (2d Cir.), cert. denied, 412 U.S. 929 (1971).

postponed pending completion of an appeal should the trial court decide to stay relief upon the posting of an appeal bond.¹⁴ In addition to the cost and time involved in obtaining and enforcing patents on computer programs, the nature of the patent system itself prevents trivial advancements from qualifying for patent protection. To be patentable, a program must incorporate an advance which is nonobvious to a programmer of ordinary skill.¹⁵

One final significant disadvantage of patent protection bears mention. Issuance of a patent discloses the program to the public, at least to an extent which will allow a programmer of ordinary skill to duplicate the function of the program.¹⁶ Until then, the commonly used methods for protecting the proprietary interest of creators of software are predicated primarily upon secrecy and the trade secret laws.¹⁷ That secrecy will be destroyed in whole or in part upon issuance of the patent, possibly undoing carefully structured systems for maintaining the exclusive ownership in the creator of the software.

Prior to publication, patent applications are maintained in secrecy.¹⁸ Since the issuance of a patent—its publication—usually occurs one to three years after filing the application for the patent, the impact of publication is diminished.¹⁹ Moreover, trade secret protection can exist until the patent issues

14. See FED. R. CIV. P. 62(d).

15. 35 U.S.C. § 103 (1982). Section 103 provides, in part:

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. . . .

Id.

16. See *id.* § 112, which provides in part:

The [patent] specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. . . .

Id.

17. For example, most mass-marketed software is protected by trade secret licenses, designed to be executed by the licensee upon opening the package containing the software. The viability of this form of license, particularly in the consumer market, is presently being tested in the courts.

18. 35 U.S.C. § 122 (1982). Section 122 provides:

Applications for patents shall be kept in confidence by the Patent and Trademark Office and no information concerning the same given without authority of the applicant or owner unless necessary to carry out the provisions of any Act of Congress or in such special circumstances as may be determined by the Commissioner.

Id.

19. On the other hand, if a foreign patent is sought claiming benefit of the United States filing date under section 119 of the Patent Act (the Act), publication may occur in the foreign country as soon as 18 months following the filing of the corresponding American application. See, e.g., Manual for the Handling of Applications for Patents, Designs and Trademarks Throughout the World, Vol. 2, Japan 3, Supplement No. 48 (January 1984, Octrooibureau Los En Stigler, Amsterdam).

and presumably, the patent protection will be more than adequate to serve the needs of the program owner thereafter.²⁰

5. The Suitable Candidates for Patent Protection

From the above, one readily concludes that relatively few programs are appropriate subject matter for patent protection. Because patent proceedings are expensive and time-consuming, the program should be commercially important and should embody creative concepts which are expected to be long-lived. Game programs, which may fade in popularity in a few months, likely prior to issuance of a patent, are generally unsuitable for patent protection, notwithstanding the great commercial potential that would otherwise justify the expense of obtaining a patent. Similarly, application programs sold in a rapidly evolving retail market are unlikely to be suitable candidates for patent protection. Of course, with respect to either game or application programs, fundamentally new features which will survive for many years may be acceptable candidates for protection. In this regard, broad patent protection, such as in the "means plus function" format,²¹ may continue to cover fundamentally new features even though subsequent enhancements of the program have caused the implementation of the feature to evolve into a specifically different form. Certainly some of the basic features of landmark spreadsheet, data base, word processing and graphics programs will be with us for many years, notwithstanding changes and enhancements. Accordingly, patent protection should be given serious consideration with respect to the basic new features of such programs.

In addition to the requirements of commercial importance and long life, a suitable candidate program for patent protection should incorporate fundamentally new programming features or advantages. Programs which demonstrate little creativity will probably not be sufficiently inventive to meet the patentability requirements. Moreover, even if the patentability requirements are met by a largely run-of-the-mill program, the resulting patent protection likely will be narrow in scope, commensurate with the narrow advance. In such cases, the narrow scope of the patent may not exceed the narrow scope of copyright protection, and thus, patent protection of such a program loses one of its main advantages over copyright protection.

In summary, the significant advantages provided by patents, with respect to both the breadth and the reach of the protection, are tempting. Few programs, however, will possess the commercial importance, expected lifetime, and novelty required to be suitable for patent protection. With respect to the few that do, patent protection should be given serious consideration in view of its superior breadth and reach.

20. If the eventually obtained patent protection is not of sufficient scope, the patentee need not pay the patent issue fee; thus no patent will issue; and the program may remain a trade secret. See *Kewanee Oil Co.*, 416 U.S. at 485.

21. See *supra* note 3 (defining "means plus function" format).

B. Copyrights

One of the basic principles of copyright law is that copyright protects only the manner of expression and not the underlying concept or idea embodied in the expression.²² In regard to computer programs, this principle is easier to state than to apply. While it is clear that copyright protection is directed at the expression represented by the series of instructional steps formulated by a computer programmer, and not the basic functionality, creative concepts, or philosophy of the program, the line between expression and function, concept, or philosophy is fuzzy at best. Over the years, the courts have developed a series of guidelines to aid in determining the breadth of a copyright, in other words, the extent to which the copyright protects more than the expression of an idea.²³ These guidelines are not always useful in analyzing copyright protection of computer programs.²⁴ With some exceptions, a work that retains the basic character of another work constitutes copyright infringement of the original, even though modified.²⁵ Nonetheless, the breadth of copyright protection is substantially narrower than that of patent protection.

The reach of copyright protection is also limited. A copyright is effective only against "copiers," or those acting in concert with them.²⁶ Any independent creation of a program, even if it both incorporates the concept or idea of a copyrighted program and uses a similar series of instructional steps, is not copyright infringement. Therefore, anyone who wishes to independently program the concept or idea of a copyrighted program can do so without constraint from the copyright laws.²⁷ If the program is sufficiently commercially important, and has a life expectancy long enough to permit one to independently write a similar program, the concepts and ideas of the copyright owner may be appropriated by others with impunity. This occurs frequently

22. *Baker v. Selden*, 101 U.S. 99, 102-03 (1880); see 17 U.S.C. § 102(b) (1982).

23. See, e.g., *Durham Indus., Inc. v. Tomy Corp.*, 630 F.2d 905 (2d Cir. 1980) (copyright in collective work covers only original aspects of collection and not pre-existing work upon which collection is based).

24. For example, the video display created by a computer program may also be copyrighted as an audio-visual work. A copyrighted audio-visual work should be defined in terms of the image or images created by the program steps and not the program steps per se. Nonetheless, the principle that it is the manner of expression (the image or images in the above example), which is protected and not the concept or idea, still applies. See *Williams Electronics, Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 874-75 (3d Cir. 1982); *Stern Electronics, Inc. v. Kaufman*, 669 F.2d 852, 885 (2d Cir. 1982); *Midway Mfg. Co. v. Artic Int'l, Inc.*, 547 F. Supp. 999, 1008-09 (N.D. Ill.), *aff'd*, 704 F.2d 1009 (7th Cir. 1982), *cert. denied*, _____ U.S. _____, 104 S. Ct. 90 (1983); *Midway Mfg. Co. v. Dirkschneider*, 543 F. Supp. 466, 479, 483 (D. Neb. 1981).

25. See *Structural Dynamics Research Corp. v. Engineering Mechanics Research Corp.*, 401 F. Supp. 1102 (E.D. Mich. 1975).

26. See *Williams Electronics, Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 876 (3d Cir. 1982); *Shapiro, Bernstein & Co. v. H.L. Green Co.*, 316 F.2d 304, 307 (2d Cir. 1963); *DeAcosta v. Brown*, 146 F.2d 408, 410-11 (2d Cir. 1944); 17 U.S.C. § 501(a) (1982).

27. See *Synercom Technology, Inc. v. University Computing Co., Inc.*, 462 F. Supp. 1003, 1009-10 (N.D. Tex. 1978); *McGraw-Hill, Inc. v. Worth Publishers, Inc.*, 335 F. Supp. 415, 419-20 (D.C. N.Y. 1971).

in the software industry and has led to the proliferation of programs using similar concepts. For example, spreadsheet, database, graphics, and word processing programs often use similar screen formats, menus and commands, although each may employ an independently generated series of program instructions.

In summary, the copyright laws permit the appropriation of the idea or concept of a copyrighted program, but not the copying of its manner of expression. Although copyrights have these limitations, they still constitute valuable protection, especially with respect to short-lived programs. Copyrights are acquired and registered at nominal cost. Most importantly, in many copyright cases preliminary injunctions are available.²⁸ The quick relief provided by copyright action stands in stark contrast to the agonizingly slow relief provided by patents. A copyright prevents the copier from taking a "free ride" at the expense of the originator of the copyrighted program. In regard to copyright protection, the price of admission to the market is the cost in time and money required to independently create a program.

C. Trade Secrets

Trade secret enforcement is most commonly used to prevent a disloyal employee from appropriating the novel work product of his employer, if that work product has been kept duly secret.²⁹ In the programming context, an employee is not permitted to take a "non-public"³⁰ program for his own use. While the courts would likely excuse the independent generation of a program accomplished wholly after an employee left his former employer, the independent generation of a program will not always be a defense to a cause of action for theft of trade secrets. For example, if the independent generation of a

28. See *Atari, Inc. v. North American Philips Consumer Electronics Corp.*, 672 F.2d 607, 620-21 (7th Cir.), cert. denied, 459 U.S. 880 (1982); *American Metropolitan Enterprises of N.Y. v. Warner Bros. Records, Inc.*, 389 F.2d 903, 905 (2d Cir. 1968).

29. See R. MILGRIM, 12 BUSINESS ORGANIZATIONS—TRADE SECRETS § 2.01, at 214 (1984). The Restatement of Torts defines a trade secret as:

any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. . . .

The subject matter of a trade secret must be secret . . . so that, except by the use of improper means, there would be difficulty in acquiring the information.

RESTATEMENT OF TORTS § 757 comment b (1939).

30. The issue of whether a program is "non-public" must be examined closely. For example, machine code may be released to customers in the form of magnetically-encoded media, while source code is zealously kept secret. Thus, the source code may be a trade secret notwithstanding the release of the machine code. Generally, a feature of a program which is not discernible from the product upon a reasonable effort to discover it can be retained as a trade secret, even though the product has been released to the public. *University Computing Co. v. Lykes-Youngstown Corp.*, 504 F.2d 518, 534 (5th Cir. 1974); *Com-Share, Inc. v. Computer Complex, Inc.*, 338 F. Supp. 1229, 1239 (E.D. Mich. 1971), *aff'd*, 458 F.2d 1341 (6th Cir. 1972); *Cybertek Computer Products, Inc. v. Whitfield*, 203 U.S.P.Q. 1020, 1024 (Cal. 1977).

program benefitted from trade secret information relating to program concepts, a court might nonetheless find a theft of the trade secret.³¹ To the extent that the courts recognize this, trade secret protection will be broader in scope than copyright protection, but substantially narrower than patent protection. Additionally, unlike patent protection, trade secret protection is fleeting. Once the program is made "public," or independently developed and disclosed, trade secret protection is lost.³² On the other hand, neither copyright protection nor patent protection is lost upon publication of the program. Even in those cases in which the trade secret was not lost by publication, some courts have limited the period of effective trade secret protection by limiting the length of an injunction against a trade secret misappropriator to the "headstart" period afforded by the misappropriation.³³ Some commentators contend that trade secret protection and copyright protection are serial, in other words, that trade secret protection is available until publication, while copyright protection is created upon publication even if the infringement is inadvertent.³⁴ Even more certainly, trade secret protection may precede patent protection, a concept long recognized in non-software cases.³⁵

Trade secret protection reaches no further than to those persons receiving secrets as a result of a breach of a contractual or fiduciary relationship with the trade secret owner.³⁶ Accordingly, trade secret protection will most often affect disloyal employees and those in privity with them. Copyright infringement requires no such relationship, but rather merely requires copying. Patent infringement requires neither a relationship of privity nor copying, for patent protection reaches even unknowing independent developers, an important advantage over trade secret and copyright protection. In summary, trade secret

31. The use of the owner's program concepts, even in the development of the subsequent program, provides an unfair competitive advantage to the wrongful acquirer, for it deprives the owner of his headstart. See *Molinario v. Burnbaum*, 201 U.S.P.Q. 150, 163 (D. Mass. 1978).

32. See *Struthers Scientific & Int'l Corp. v. Rappl & Hoenig Co.*, 453 F.2d 250, 254-55 (2d Cir. 1972); *Republic Systems & Programming, Inc. v. Computer Assistance, Inc.*, 322 F. Supp. 619, 628 (D. Conn. 1970), *aff'd*, 440 F.2d 996 (2d Cir. 1971); *Sinclair v. Aquarius Electronics, Inc.*, 42 Cal. App. 3d 216, 116 Cal. Rptr. 654 (1974).

33. See *Anaconda Co. v. Metric Tool & Die Co.*, 485 F. Supp. 410, 430-31 (E.D. Pa. 1980); *Data General Corp. v. Digital Computer Controls, Inc.*, 297 A.2d 433, 436 (Del. Ch. 1971), *aff'd*, 297 A.2d 437 (Del. 1972). Unlike a patent, which provides protection for the invention for the period of time for which it is granted, the protection afforded by a trade secret lasts only as long as competitors fail to duplicate it through legitimate, independent research. See *University Computing Co. v. Lykes-Youngstown Corp.*, 504 F.2d 518, 534 (5th Cir. 1974).

34. Although copyright protection is created upon publication, such protection may also have existed previously on the software as an unpublished work. The argument that trade secret protection is not destroyed by affixing a copyright notice to an unpublished work is controversial. See *Technicon Medical Info. System v. Green Bay Packaging, Inc.*, 687 F.2d 1032, 1039 (7th Cir. 1982), *cert. denied*, 459 U.S. 1106 (1983); *BPI Systems v. Leith*, 532 F. Supp. 208, 210-11 (W.D. Tex. 1981); *M. Bryce & Assoc. v. Gladstone*, 107 Wis.2d 241, 256, 319 N.W.2d 907 (Wis. App.), *cert. denied*, 459 U.S. 944 (1982).

35. See *Kewanee Oil Co. v. Bicon Corp.*, 416 U.S. 470, 487-88 (1974).

36. See *Wexler v. Greenberg*, 399 Pa. 569, 160 A.2d 430 (1960); *By-Buk Co. v. Printed Cellophane Tape Co.*, 163 Cal. App.2d 157, 166, 329 P.2d 147, 150 (Cal. Ct. App. 1958).

protection, while of great importance, is quite restricted. It is limited in breadth to only those programs which are in fact trade secrets, and limited in reach to only those persons who either breached a fiduciary relationship with the program owner or who are in privity with one who has breached such a fiduciary relationship.

II. VALIDITY OF SOFTWARE RELATED PATENTS

A. Computer Programs as Statutory Subject Matter Under Section 101 of the Patent Act—A Brief History

The patentability of computer programs has had a rather turbulent history. Various elements of the business and legal communities have come down on opposite sides of the issue. On the one hand, the Patent Office,³⁷ the 1966 President's Commission on the Patent System,³⁸ as well as IBM, Burroughs, and Honeywell³⁹ argued that computer programs should not be patentable. The Patent Office in *Gottschalk v. Benson*⁴⁰ and *Parker v. Flook*,⁴¹ for example, argued that it was not well equipped to examine patent applications relating to computer programs. On the other hand, the Patent Bar,⁴² soon followed by an emerging software industry, urged that computer programs be treated like any other new technology, and hence be deemed patentable if the requirements for invention were met.⁴³ The battle was initially fought in the Patent Office and in the Court of Customs and Patent Appeals (CCPA) with the Patent Office consistently rejecting patent applications on computer programs and the CCPA, almost equally consistently, reversing the Patent Office's decisions.⁴⁴

The Supreme Court eventually addressed the issue in *Gottschalk v. Benson*,⁴⁵ a case which in the opinion of many, merely muddled the waters.

37. See, e.g., 829 OFF. GAZ. PAT. OFC. 865 (Aug. 16, 1966); Brief of Petitioner, *Gottschalk v. Benson*, 34 L.Ed.2d 744 (1972).

38. See Report of President's Commission on the Patent System, *To Promote the Progress of Useful Arts* (G.P.O. 1966).

39. See Briefs of Amicus Curiae, *Benson*, 34 L.Ed.2d at 745-46 (urging reversal).

40. 409 U.S. 63, 72 (1972).

41. 437 U.S. 584, 587 (1978). Surely, the Patent Office must have found it slightly embarrassing to assert that it, the government organization having the premiere responsibility for fostering new technologies, was itself incapable of dealing with a new technology. In practice, the Patent Office has shown itself well-qualified to examine applications on computer programs.

42. See Briefs of American Patent Law Association and Patent Law Association of Chicago, *Benson*, 34 L.Ed.2d at 746 (urging affirmance).

43. See e.g., *Diamond v. Diehr*, 450 U.S. 175, 217 n. 42 (1981).

44. See *In re Waldbaum*, 457 F.2d 997, 1003 (C.C.P.A. 1972), *aff'd*, 559 F.2d 611 (C.C.P.A. 1977); *In re Musgrave*, 431 F.2d 882, 893 (C.C.P.A. 1970); *In re Mahony*, 421 F.2d 742, 746-47 (C.C.P.A. 1970); *In re Bernhart*, 417 F.2d 1395, 1403 (C.C.P.A. 1969); *In re Prater*, 415 F.2d 1393, 1405-06 (C.C.P.A. 1969) (Prater II); *In re Prater*, 415 F.2d 1378, 1389 (C.C.P.A. 1968) (Prater I); *In re Naquin*, 398 F.2d 863, 866 (C.C.P.A. 1968); *Ex parte Jensen*, 163 U.S.P.Q. 117, 118 (P.O. Bd. App. 1968); see also Kayton, *Patent Protectability of Software: Background and Current Law*, *Law of Software 1968 Proceedings*, B-25, reprinted in 9 JURIMETRICS J., 127 (Mar. 1969).

45. 409 U.S. 63 (1972).

In *Benson*, the Supreme Court held unpatentable a computer program for converting binary-coded decimal numerals to binary numerals,⁴⁶ but declined to foreclose completely the patentability of computer programs. The Supreme Court's decision in *Benson* was founded on the belief that the method claims at issue wholly preempted the "mathematical algorithm" by which the binary-coded decimal-to-binary conversion was effected.⁴⁷ The Patent Office, not unexpectedly, believed that the *Benson* decision closed the issue of the patentability of computer programs.⁴⁸ The CCPA on the other hand, in *In re Johnston*⁴⁹ defined an "apparatus" exception to *Benson* by characterizing that decision as involving only whether a series of mathematical calculations can be a patentable "process," not an "apparatus."⁵⁰

The Patent Office was successful in obtaining Supreme Court review of *In re Johnston*, a case which squarely presented the patentability issue.⁵¹ Unfortunately the Supreme Court in *In re Johnston* declined to rule on the patentability issue and decided the case on a routine "obviousness" finding.⁵² After *Johnston*, the CCPA continued to develop exceptions to the *Benson* decision.⁵³ In *Parker v. Flook*⁵⁴ the Supreme Court again rejected an application to patent a computer program.⁵⁵ Justice Stevens, writing for the majority in *Flook*, held that the patent application as a whole contained no patentable invention.⁵⁶ The effect of the *Flook* decision was to temper, although not halt, the CCPA's attempts to expand the exceptions to *Benson*. Consequently, *Flook* did little, if anything, to settle the issue of whether computer programs were patentable, as illustrated by the continuing controversy between the Patent Office and the CCPA on this matter.

Notwithstanding *Flook*, the CCPA continued to find patentable subject matter in computer program inventions,⁵⁷ albeit at a decreasing rate, to the delight of a substantial portion of the Patent Bar. Clearly, however, the CCPA

46. See *id.* at 71-73.

47. See *id.* at 71.

48. See Brief of Petitioner, *Dann v. Johnston*, 425 U.S. 219, 47 L.Ed.2d 969, 970 (1976).

49. 502 F.2d 765 (C.C.P.A. 1974), *rev'd sub. nom.*, *Dann v. Johnston*, 425 U.S. 219 (1976). The device in *Johnston* was a record keeping machine for banking transactions. *Id.*

50. See *id.* at 771.

51. See *In re Johnston*, 425 U.S. 219 (1976).

52. See *id.* at 225.

53. See *In re Toma*, 575 F.2d 872, 877-78 (C.C.P.A. 1978); *In re Freeman*, 573 F.2d 1237, 1245-46 (C.C.P.A. 1978); *In re Deutsch*, 553 F.2d 689, 692-93 (C.C.P.A. 1977); *In re Chatfield*, 545 F.2d 152, 158 (C.C.P.A.), *cert. denied*, 434 U.S. 875 (1977); *In re Noll*, 545 F.2d 141, 148-49 (C.C.P.A. 1976).

54. 437 U.S. 584 (1978). The patent in *Flook* related to a computer program which set alarm limits for control of a chemical process. See *id.* at 585.

55. See *id.* at 596.

56. *Id.* at 594 (Supreme Court found that respondent's application contained no claim of patentable invention).

57. See *In re Sherwood*, 613 F.2d 809, 817-18 (C.C.P.A.), *cert. denied*, 450 U.S. 994 (1980); *In re Bradley and Franklin*, 600 F.2d 807, 811 (C.C.P.A. 1979), *aff'd per curiam*, 450 U.S. 381 (1980); *In re Diehr and Lutton*, 602 F.2d 982 (C.C.P.A. 1979), *aff'd sub. nom.*, *Diamond v. Diehr*, 450 U.S. 175 (1980); *In re Johnson*, 589 F.2d 1070 (C.C.P.A. 1978).

respected the opinions of the Supreme Court; in fact, the CCPA felt constrained by its obligation to follow superior authority in defining patentable subject matter relating to computer programs.⁵⁸ For that reason, throughout this period the CCPA found it necessary to reject a number of computer program inventions which, but for *Benson* and *Flook*, may have been accepted as patentable subject matter under section 101 of the Patent Act (the Act).⁵⁹ During the post-*Benson* and post-*Flook* period, the frustration of the Patent Office can well be imagined. Notwithstanding its perception of *Benson* and *Flook* as significant victories in the Supreme Court, the Patent Office was nonetheless forced to receive and examine patent applications for computer programs.

The first real encouragement provided by the Supreme Court to proponents of the patentability of computer programs came in the Court's decisions in *Diamond v. Diehr*⁶⁰ and *Diamond v. Bradley*.⁶¹ In *Diehr*, the Supreme Court held by a one vote majority that a computer controlled rubber molding process was patentable subject matter.⁶² In *Bradley*, an equally divided Supreme Court affirmed a CCPA holding to the effect that a CPU firmware module for controlling a computer in a multi-programming mode was patentable subject matter.⁶³ The *Diehr* and *Bradley* decisions effectively allowed the CCPA to continue its efforts to define patentable subject matter in computer program related inventions.

B. Computer Programs as Statutory Subject Matter Under Section 101 of the Act—The Current Test

An understanding of the issue of the patentability of computer programs as it exists today can be obtained by considering the decisions of the CCPA

58. Cf. *In re Sherwood*, 613 F.2d 809, 812 (C.C.P.A. 1980) "[The] [a]pplicant's assertion that the *Benson* decision upholds the patentability of the presently claimed invention fails to take into consideration the *entire* opinion as presented by Mr. Justice Douglas." *Id.*

59. See *In re Walter*, 618 F.2d 758, 769 (C.C.P.A. 1980); *In re Gelnovatch*, 595 F.2d 32, 41-42 (C.C.P.A. 1979); *In re Castelet*, 652 F.2d 1236, 1243-44 (C.C.P.A. 1977); *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977); *In re Christensen*, 478 F.2d 1392, 1394 (C.C.P.A. 1978).

60. 450 U.S. 175 (1981). The patent at issue in *Diamond v. Diehr* related to a computer-controlled rubber molding process by which the temperature in a mold was continuously monitored, a known rubber cure-time formula was repetitively recalculated using the monitored mold temperature, and the mold was opened automatically when the calculated cure time and the actual cure time were equal. See *id.* at 178-79. The *Diehr* majority held that the process was patentable, notwithstanding the fact that it provided for the computer implementation of a mathematical algorithm, because the process was effective to "transform and reduce an article to a different state or thing." *Id.* at 192.

61. 450 U.S. 381 (1981). *Bradley* involved a CPU firmware module which was programmed to direct system data base transfers between the main memory of the computer and scratchpad registers to more efficiently control the operation of the computer in a multi-programming mode. See *In re Bradley*, 600 F.2d 807, 808-09 (C.C.P.A. 1979), *aff'd per curiam*, 450 U.S. 381 (1980). The C.C.P.A. held that the applicants were claiming a combination of hardware elements which allowed the computer to alter stored information in a new way, and not the firmware per se. *Id.* at 812. The C.C.P.A. did not find the presence of any mathematical algorithm, even though the firmware caused elemental calculations, and held the invention patentable. *Id.* at 813. The Supreme Court affirmed the C.C.P.A.'s holding per curiam. See 450 U.S. at 381.

62. See 450 U.S. at 191-93.

63. See 450 U.S. at 381.

and its successor court, the Court of Appeals for the Federal Circuit (CAFC), which follow *Diehr* and *Bradley*. Of particular interest is the CCPA's two-part test for defining patentable subject matter under section 101 of the Act.⁶⁴ Under the CCPA test, which is now applicable as binding precedent on the Court of Appeals for the Federal Circuit in view of *South Corp. v. United States*,⁶⁵ a claim is patentable if either of the following conditions are met:

(1) the claim does not directly or indirectly recite a "mathematical algorithm"; or

(2) although the claim involves a "mathematical algorithm," the claim contains additional recitations which apply the algorithm to physical elements (of an apparatus claim) or process steps (of a method claim), and the claim therefore does not wholly preempt the algorithm.⁶⁶

Thus, the first consideration in evaluating any patent involving a computer program is whether the patent claims include within their scope a mathematical algorithm. Importantly, not every algorithm raises a statutory subject matter question. Although the term "algorithm" is broad, and almost any process or series of logical steps can be characterized as an algorithm, the courts to date have been concerned primarily with essentially mathematical algorithms or formulas. For example, in *Benson*, the Supreme Court defined the term "algorithm" as a "procedure for solving a given type of mathematical problem."⁶⁷

Examples of claimed subject matter of patent applications that include mathematical algorithms are: (1) the binary-coded-decimal to binary conversion process of *Benson*;⁶⁸ (2) the quadratic equation for computing the porosity of subsurface formations in *In re Christensen*;⁶⁹ (3) the method of calculating the number of busy and idle lines in the telephone system in *In re Waldbaum*;⁷⁰ (4) the mathematical formula for calculating airborne radar bore sight correction angles in *In re Richman*;⁷¹ the method of calculating alarm limits for controlling a parameter of a catalytic hydrocarbon conversion process in *Parker v. Flook*;⁷² (6) a CAT scan imaging technique using a calculation for reducing the exposure of the body to radiation in *In re Abele*;⁷³ and (7) the rubber cure time formula in *Diehr*.⁷⁴

64. The two-part test was first set forth in *In re Freeman*. See *In re Freeman*, 573 F.2d 1237, 1245-46 (C.C.P.A. 1978).

65. 690 F.2d 1368 (C.A.F.C. 1982).

66. See *In re Freeman*, 573 F.2d 1273, 1245 (C.C.P.A. 1978).

67. See *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

68. See *id.*

69. See *In re Christensen*, 478 F.2d 1392 (C.C.P.A. 1973).

70. See *In re Waldbaum*, 559 F.2d 611 (C.C.P.A. 1977).

71. See *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977).

72. See *Parker v. Flook*, 437 U.S. 484 (1978).

73. See *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).

74. See *Diamond v. Diehr*, 450 U.S. 175 (1981).

Examples of a series of logical steps which are not mathematical algorithms are: (1) the method for processing text and graphical information for display on a cathode ray tube in *In re Noll*; ⁷⁵ (2) the method of operating a multi-programming computer system involving the accumulation of data and determination of task priorities in *In re Chatfield*; ⁷⁶ (3) the method for controlling and optimizing the operation of oil refineries at different geographic locations in *In re Deutsch*; ⁷⁷ (4) the digitally controlled electro-optical imaging system for a television system in *Hirschfeld v. Banner*; ⁷⁸ (5) the method for controlling the internal operation of a computer to convert the computer from a sequential processor to a nonsequential processor in *In re Pardo*; ⁷⁹ and (6) the method for improving computer performance by using firmware to direct data transfers between the main memory and the scratchpad registers in *Diamond v. Bradley*. ⁸⁰

The CCPA's two-step test originated in *Benson*, *Freeman* and *In re Walter*, ⁸¹ all of which were pre-*Diehr* cases. In *Walter*, the CCPA addressed patent claims concerning a process for correlating and cross-correlating signals. ⁸² The preamble of the claim stated that such correlations were to be used in connection with seismic surveying, but the body of the claim was not so limited. ⁸³ The CCPA stated that if a mathematical algorithm is merely presented and solved by the claimed invention, *and is not applied in any manner to the physical elements of an apparatus claim or to the process steps of a method claim*, neither a recitation of post-solution activity in the body of the claim nor a preamble reciting the field of use of the mathematical algorithm will save the claim. ⁸⁴ Because the *Walter* claims merely recited the field of use of the mathematical algorithm in the preamble, they failed the second part of the two-step analysis. ⁸⁵

The statement by the CCPA in *Walter* that "no amount of post-solution activity will render the claim statutory" ⁸⁶ should not be taken at face value. In *Walter*, the CCPA stated that recitations which *apply* a mathematical algorithm to physical elements of apparatus claims or to process steps of method claims will save the claim. ⁸⁷ Yet, such redeeming physical elements or process steps arguably relate to post-solution activity. Consequently, the

75. See *In re Noll*, 545 F.2d 141 (C.C.P.A. 1976).

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

77. See *In re Deutsch* 553 F.2d 689 (C.C.P.A. 1977).

78. See *Hirschfeld v. Banner*, 462 F. Supp. 135 (D.D.C. 1978), *aff'd*, 615 F.2d 1368 (D.C. Civ. 1980), *cert. denied*, 450 U.S. 994 (1981).

79. See *In re Pardo* and *Landau*, 684 F.2d 912 (C.C.P.A. 1982).

80. See *Diamond v. Bradley*, 450 U.S. 175 (1981).

81. 618 F.2d 758 (C.C.P.A. 1980).

82. See *id.* at 761.

83. *Id.* at 760-62.

84. *Id.* at 767.

85. See *id.* at 770.

86. *Id.* at 767.

87. See *id.*

statement that a recitation of post-solution activity will not save the claim should be read to mean that a naked recitation of post-solution activity *which does not properly apply the mathematical algorithm to physical elements of a apparatus claim or to process steps of a method claim* will not save the claim. Proper recitation of the nexus between the algorithm and the post-solution activity apparently will render the claim patentable.

The CCPA attempted to clarify this issued in *In re Abele*,⁸⁸ a post-*Diehr* decision. The specific claims at issue in *Abele* concerned a method practiced by a CAT scan machine which required, by reference to the specification, the passing of an X-ray beam through an object, the detection of the beam thereafter, the performance of an algorithm to modify the detected information, and the display of the data in the required format.⁸⁹ The *Abele* claims were made to a CAT scan imaging technique which used a mathematical algorithm for calculating exposure times.⁹⁰ Because the *Abele* claims involved a mathematical algorithm, the second part of the two-step analysis was directly at issue.⁹¹ The CCPA restated its conclusions from the *Walter* case, then wrestled with the question of the quality required of the redeeming recitations which apply the mathematical algorithm to physical elements or process steps.⁹² The CCPA stated that:

... *Walter* should be read as requiring no more than that the algorithm be 'applied in any manner to physical elements or process steps,' provided that its application is circumscribed by more than a field of use limitation or non-essential post-solution activity. Thus, if the claim would be 'otherwise statutory,' . . . albeit inoperative or less useful without the algorithm, the claim likewise presents statutory subject matter when the algorithm is included. This broad reading of *Walter*, we conclude, is in accord with the Supreme Court decisions [including *Diehr*].⁹³

The CCPA in *Abele* appeared to suggest that a relatively low threshold requirement will be set for non-algorithmic recitations which apply a mathematical algorithm to its end use. This is not to say that illusory or de minimis recitations will redeem the claim. As illustrated by the statement in *Abele* quoted above, the CCPA has indicated that a mere field of use limitation (apparently regardless of its location in the claim) or a *non-essential* post-solution activity will not save a claim. Claims 5 and 6⁹⁴ of *Abele* should be

88. See *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).

89. See *id.* at 908.

90. See *id.* at 908.

91. See *id.* at 909.

92. See *id.* at 906-07.

93. *Id.* at 907.

94. Claim 5 in *Abele* recited the method there at issue:

5. A method of displaying data in a field comprising the steps of calculating the difference between the local value of the data at a data point in the field and the average value of the data in a region of the field which surrounds said point for each point in said field, and displaying the value of said difference as a signed gray scale at a

compared since they delineate the "good" and "bad" of the novel method which embodied the algorithm, but failed the statutory subject matter test because it lacked the recitations which applied the algorithm to a particular process.⁹⁵ Claim 6, which merely added the familiar CAT scan machine environment with its data gathering capability, passed without close analysis by the court.⁹⁶

In its analysis of Claim 6 the *Abele* court placed heavy reliance on the inclusion of X-ray attenuation data. The court observed that "data is available only when an X-ray beam is produced by a CAT scanner, passes through an object, and detected upon its exit."⁹⁷ The *Abele* court then analyzed the claim absent the algorithm. It viewed the X-ray production, detection, and data display steps as manifestly statutory subject matter, notwithstanding the presence of a mathematical algorithm in the claimed method.⁹⁸ The court concluded that the claim presented data-gathering steps which did not follow from the presence of the algorithm, but rather from other limitations in the claims which required the data.⁹⁹ Thus, the *Abele* court did not view the non-algorithmic steps in the claim as being merely antecedent to obtain information for solving the algorithm. Because the pre-solution activity and the production and detection of X-rays were more than the mere antecedent steps to obtain values for solving the algorithm, the court found Claim 6 patentable.¹⁰⁰ It is clear from the cases discussed above that the CCPA is not reluctant to search out the limitations which connect an otherwise unpatentable algorithm to redeeming process steps to save a patent. In keeping with its historical viewpoint, the CCPA appears not to be looking for reasons to invalidate computer program claims, but rather for supportable reasons to uphold those claims.

Abele should be compared to the decision in *In re Taner*,¹⁰¹ a case decided two months earlier yet also after *Diehr*. In *Taner*, the CCPA had before it a claim to a method of seismic exploration by which substantially plane or substantially cylindrical seismic energy waves are simulated from the predominantly spherical seismic waves imparted to the earth by an explosion.¹⁰² The claim called for three steps: (1) imparting spherical seismic energy waves into the earth, for example, by an explosion; (2) generating reflection signals

point in a picture which corresponds to said data point.

Id. at 908.

Claim 6 of *Abele* added the CAT environment to the method recited in Claim 5:

6. The method of Claim 5 wherein said data is X-ray attenuation data produced in a two dimensional field by a computed tomography scanner.

Id.

95. *See id.*

96. *See id.*

97. *Id.* at 908-09.

98. *See id.* at 908.

99. *See id.*

100. *See id.*

101. 681 F.2d 787 (C.C.P.A. 1982).

102. *See id.* at 787.

at receivers in a spaced array; and (3) summing the reflection signals to simulate the reflection response of a plane or substantially cylindrical seismic wave, the mathematical algorithm.¹⁰³ No display or other utilization of the data was claimed.¹⁰⁴ As a result of the absence of a utilization recitation, a more expansive view of permissive subject matter was required in *Taner* than was required of the CAT scan method in *Abele*, which did claim display of the data in a certain format. In *Taner*, the Patent and Trademark Office Board of Appeals characterized the summing step as a mathematical algorithm.¹⁰⁵ The CCPA, however, found that the claims were statutory, emphasizing that the seismic signals obtained in a conventional way were *converted* into another form, in other words, a form representing plane or cylindrical waves.¹⁰⁶ The CCPA in *Taner* did not appear to rest its position on the steps of imparting seismic waves into the earth or receiving reflections of the seismic waves, but rather, on the fact that a *Diehr*-type transformation had occurred, that is, the transformation or reduction of an article into a different state or thing.¹⁰⁷ Because the CCPA did not rely on the imparting or receiving steps, *Taner* may be read broadly as stating that an algorithm which causes the conversion of a signal from one form to another constitutes statutory subject matter.

The *Taner* decision preceded the *Abele* and *Pardo* decisions, and did not rest upon the *Freeman/Walter* two-part test, but rather upon the *Diehr* "transformation" test. While it may be that the *Taner* decision is merely an initial response to the *Diehr* decision, that is, an attempt by the CCPA to conform its holding to the literal language of *Diehr*, *Taner* may also constitute more than an interim stage in the development of the philosophy of the CCPA in computer program cases. In fact, *Taner* may be broadly read to establish a second, independent statutory test which, if passed, renders a claim statutory without regard for the outcome of the *Freeman/Walter* test. Of course, the *Taner* seismic exploration method arguably also may have passed the *Freeman/Walter* test, albeit by a closer margin, had the CCPA applied it. Nonetheless, it will be interesting to see if in its future opinions the CAFC develops the "transformation" test of *Taner*.

The last CCPA computer program decision issued before the CCPA was abolished, *In re Meyer and Weissman*,¹⁰⁸ concerned a method and apparatus for assisting a neurologist in examining and diagnosing a patient.¹⁰⁹ The claims recited a series of steps which corresponded to the mental processes that a neurologist would follow during the diagnosis of a patient.¹¹⁰ Although it is questionable whether the *Meyer* steps amounted to a mathematical algorithm,

103. *See id.*

104. *See id.*

105. *Id.* at 790.

106. *See id.*

107. *See id.* at 791.

108. 688 F.2d 789, (C.C.P.A. 1982).

109. *See id.* at 791.

110. *See id.* at 795.

the applicants admitted at oral argument that the steps were a mathematical algorithm.¹¹¹ The CCPA, quite naturally, relied upon the applicants' admission and proceeded immediately to the second part of the two-part test of *Freeman, Walter, Pardo and Abele* to determine whether the claim contained the additional redeeming recitations.¹¹² Finding none, the court held that the claims were non-statutory.¹¹³ Unfortunately, little can be learned from the *Meyer* case because the admission by the applicants that a mathematical algorithm was claimed foreclosed a thorough consideration of the issue. The claimed subject matter in *Meyer* appeared to be no more than a neurologist's handbook stored in a computer.¹¹⁴ It would have been helpful, from the standpoint of the development of the law, if the CCPA had considered whether a program containing such information preempted non-statutory subject matter, such as the rules or principles of neurological medicine.

There has been little recent activity on the issue of whether computer programs are patentable under section 101 of the Act. The Court of Appeals for the Federal Circuit has provided no direct guidance on this issue. The Federal District Court for the District of Delaware, however, recently considered the issue in *Paine, Webber, Inc. v. Merrill Lynch, Inc.*¹¹⁵ The patent claim in *Paine, Webber* concerned a data processing method and apparatus for operating a "Securities Brokerage-Cash Management System."¹¹⁶ Paine, Webber, seeking a summary judgment to invalidate the patent, argued that the claims defined nothing more than a combination of familiar business systems, including margin brokerage accounts, money market funds, and checking/charge accounts, and maintained that a valid patent cannot exist on claims directed to a computer program that merely implements such business systems.¹¹⁷ The *Paine, Webber* court struggled with the definition of the crucial term "algorithm" and the issue of whether that term was applicable to the patented cash management system.¹¹⁸ Bowing to authority¹¹⁹, the court decided that "algorithm" means a "procedure for solving a given type of mathematical problem,"¹²⁰ and held that:

[u]sing this definition, this Court has carefully examined the claims in this case and is unable to find any direct or indirect recitation of

111. See *id.*

112. See *id.* at 796.

113. See *id.*

114. See *id.* at 793.

115. 564 F. Supp. 1358 (D. Del. 1983).

116. See *id.* at 1364.

117. See *id.* at 1365. Paine, Webber apparently believed that a "business system" is the equivalent of a "mathematical algorithm", even though there may be little mathematics involved in the business system. See *id.* at 1365. A "business system," whether or not it includes algorithms, has traditionally been viewed as unpatentable subject matter. See *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467 (2d Cir. 1908).

118. See 564 F. Supp. at 1366-68.

119. See *supra* text accompanying notes 45-47 (*Benson*).

120. See 564 F. Supp. at 1368.

a procedure for solving a mathematical problem. Rather, the patent allegedly claims a methodology to effectuate a highly efficient business system and does not restate a mathematical formula as defined by *Benson*. Nor are any of the recited steps in the claims mere procedure for solving mathematical problems. Accordingly, the claims do not recite or preempt an algorithm.¹²¹

As to the defendant's contention that the patented program defined nothing more than familiar business systems, the *Paine, Webber* court held that if no *Benson*-type algorithm existed, the fact that the computer program effectuated a business activity was irrelevant.¹²²

If not there already, the courts are clearly moving toward the position that computer programs are statutory subject matter under section 101 of the Act. In view of the CAFC's exclusive appellate jurisdiction over patent cases throughout the United States, this trend will probably continue absent further intervention by the Supreme Court.

C. Nonobviousness Under Section 103 of the Act

Consideration of novelty under section 102 of the Act is not discussed herein because the application of the novelty standard to computer program inventions is guided by conventional principles and presents few unique problems in the computer program area. The question of obviousness under section 103, however, is another matter. It was suggested above that on practical grounds, claims directed to broad "concepts" are the best candidates for enforcement through patent litigation. It is also suggested that "concept" inventions probably have a greater chance of surviving the obviousness test during litigation than claims directed to the specific manner by which a program is implemented or carried out. This conclusion is founded on the observation that the typical implementation of a computer program represents the height of logical thinking. Traditionally, it has been difficult to separate in the course of patent litigation that which is logical from that which is obvious and therefore not patentable. More often than not, the courts have equated logical subject matter with obvious subject matter, even though the two are not necessarily related. For example, Einstein's famous equation $E=mc^2$ is logical, but comprehension of the derivation of the equation was beyond most physicists when the equation was first made known.

In a typical computer program, each step of the program is an expression of precise meaning. Each step is logically related to other steps in the program, with the constraints of the process defining narrow corridors through which the programmer must pass. At this level an argument that specific programming steps are obvious is thus easily made and will likely be sustained. This is not to say that some claims which are directed to specific programm-

121. *Id.*

122. *Id.* at 1369.

ing steps, as opposed to "concepts," will not be found to pass the nonobviousness test, but only that each such patent claim will probably face a long and difficult struggle for patentability. Ironically, the clever manipulations by which the plaintiff in *Benson* converted binary-coded decimal to binary code could probably survive the nonobviousness analysis under section 103.

Under section 103 of the Act, as interpreted by the Supreme Court in *Graham v. John Deere*,¹²³ a claimed invention is not patentable if the difference between the claimed subject matter and the prior art is such that the subject matter as a whole would have been obvious at the time that the invention was made "to a person having ordinary skill in the art to which said subject matter pertains."¹²⁴ There are, however, many examples of inventions in non-computer fields that are implemented in part by a computer program, such as the rubber molding process in *Diamond v. Diehr*,¹²⁵ the bore sight correction process in *In re Richman*,¹²⁶ the seismic exploration processes in *In re Christensen*¹²⁷ and *In re Taner*,¹²⁸ and the petrochemical control process in *In re Deutsch*.¹²⁹ In those cases, is the person of ordinary skill as defined in section 103 a computer programmer or a person skilled in the relevant non-computer art? More ominously for the patent owner, should the court combine a computer programmer and a person skilled in the relevant non-computer art? The Second Circuit decision in *Digitronics Corp. v. New York Racing Ass'n.*,¹³⁰ suggests that different disciplines can be combined in determining the obviousness of an invention under section 103. That case involved a betting totalizer for a parimutal betting system.¹³¹ The prior art totalizers were complex mechanical machines.¹³² The invention at issue in *Digitronics* utilized a programmed digital computer to accomplish the functions of the prior mechanical totalizers.¹³³ The patent owner argued that those skilled in the totalizer art were not skilled computer programmers, and hence, the level of skill of a computer programmer was inapplicable to an analysis of whether the invention was obvious.¹³⁴ The district court disagreed, and considered the expertise of a computer programmer relevant to the obviousness analysis.¹³⁵ The district court found the invention obvious and thus ineligible for patent protection, a holding the Second Court affirmed on appeal.¹³⁶

123. *Graham v. John Deere*, 383 U.S. 1. (1966).

124. See 35 U.S.C. § 103; 383 U.S. at 17.

125. See *Diamond v. Diehr*, 450 U.S. 175 (1981).

126. See *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977).

127. See *In re Christensen*, 478 F.2d 1392 (C.C.P.A. 1973).

128. See *In re Taner*, 681 F.2d 787 (C.C.P.A. 1982).

129. See *In re Deutsch*, 553 F.2d 689 (C.C.P.A. 1977).

130. 553 F.2d 740 (2d Cir.), cert. denied, 434 U.S. 860 (1977).

131. See *id.* at 741.

132. See *id.* at 746.

133. See *id.* at 747.

134. See *id.* at 744.

135. See *id.* at 745.

136. See *id.* at 749.

While overturning a Patent Office rejection based on the failure to provide an enabling disclosure as required under section 112, the CCPA in *In re Naquin*¹³⁷ may have inadvertently assisted those who wish to combine distinct technical disciplines to invalidate computer program patents as obvious under section 103. In *Naquin*,¹³⁸ the Patent Office rejected a patent claim for a method of underground seismic exploration, asserting that the specification did not disclose the claimed invention as required by section 112 because the specification failed to disclose any computer program necessary to implement the process.¹³⁹ The Patent Office's position was that "while one skilled in the computer programming art may perform the method, one skilled in the seismic prospecting art cannot."¹⁴⁰ The CCPA rejected the Patent Office's contention, holding that if an invention involves two distinct arts, the specification in a patent application concerning that invention is adequate if the specification enables those proficient in each art to be able to implement those aspects of the invention appropriate to their respective arts.¹⁴¹

Can the *Naquin* logic be applied to the analysis of nonobviousness required by section 103? Where claimed subject matter involves discreet computer and non-computer arts, is it a combination of the adept of each art that determines who is the "person of ordinary skill?" Because "person" is written in the singular in section 103, the argument can be made that the language of the statute prohibits the combination of persons of different arts. On the other hand, a contrary argument can be made that the person skilled in the non-computer art would rely upon the person skilled in the computer art to carry out the programming, thereby effectively combining the skills of the non-computer and computer persons in a single person.

The Supreme Court's analysis of whether computer programs are patentable under section 103 has proven unsatisfactory to date. In *Dann v. Johnston*,¹⁴² the Supreme Court considered a patent claim to a record keeping machine for bank checks and deposits that provided customers with statements containing certain unique information.¹⁴³ The Supreme Court ignored the question of whether the record keeping machine constituted statutory subject matter under section 101 of the Act, and found the claimed subject matter to be obvious under section 103 because it was similar to data processing systems in widespread use in the banking industry.¹⁴⁴

D. Compliance with the Disclosure Requirements of Section 112 of the Act

The leading case concerning the sufficiency of disclosure of computer-

137. 398 F.2d 863 (C.C.P.A. 1968).

138. *Id.*

139. *See id.* at 866.

140. *Id.*

141. *See id.*

142. 425 U.S. 219 (1976).

143. *See id.* at 221.

144. *See id.* at 229.

related inventions under section 112 is *In re Sherwood*.¹⁴⁵ The invention at issue in *Sherwood* involved a geophysical prospecting apparatus which used data from a plurality of seismic wave receivers and computed a cross-sectional map depicting the position and shape of subsurface formations.¹⁴⁶ The specification was directed primarily to an analog computer apparatus suitable for producing the desired subsurface map.¹⁴⁷ Intending presumably to disclose the "best mode," the applicant stated that "[t]he best mode contemplated by the inventor of carrying out the invention is to perform the processing steps of the invention on a large-scale digital computer with the processed data imprinted into visible form on any one of the presently-available plotting devices."¹⁴⁸ The application did not contain a disclosure of the digital computer or its program.¹⁴⁹

Pursuant to section 112, the Patent Office rejected the applicant's claims on the ground that they were based upon an inadequate disclosure, contending that the best mode had not been described in sufficient detail.¹⁵⁰ The applicant in *Sherwood* had admitted that a working computer program existed as of the filing date of the application, and therefore he had much more information in his possession concerning the best mode than was presented in the specification.¹⁵¹ Relying on affidavits from experts submitted to establish the ease with which the teachings of the specification could be converted into a computer program, the CCPA found the "disclosure not so poor as to result in concealment of the best mode."¹⁵² The CCPA reasoned that:

[I]n general, writing a computer program may be a task requiring the most sublime of the inventive faculty or it may require only the droning use of a clerical skill. The difference between the two extremes lies in the creation of mathematical methodology to bridge the gap between the information one starts with (the "input") and the information that is desired (the "output"). If these bridge-gapping tools are disclosed, there would seem to be no cogent reason to require disclosure to the menial tools known to all who practice this art.¹⁵³

Another case involving the sufficiency of disclosure under section 112 is *White Consolidated Industries v. Vega Servo-Control, Inc.*¹⁵⁴ In *White* the patentee deliberately omitted from a patent application concerning a computer operated machine tool the proprietary computer program of his employer.¹⁵⁵

145. 613 F.2d 809 (C.C.P.A. 1980), *cert. denied*, 450 U.S. 994 (1981).

146. *Id.* at 811-12.

147. *See id.* at 812.

148. *Id.*

149. *See id.*

150. *Id.* Section 112 of the Act requires the patent application to "set forth the best mode contemplated by the inventor of carrying out his invention." 35 U.S.C. § 112 (1982).

151. *See* 613 F.2d at 816-17.

152. *Id.* at 817.

153. *Id.* at 816-17.

154. 713 F.2d 788 (C.A.F.C. 1983), *aff'g* 214 U.S.P.Q. 796 (S.D. Mich. 1982).

155. *See id.* at 790.

The patentee suggested in the patent application that his employer's proprietary program, available at a price, could be used.¹⁵⁶ The patentee's employer maintained the program as a trade secret and had been licensing its use.¹⁵⁷ Clearly, the patentee was attempting to "have his cake and eat it too" by seeking to protect the program after the patent issued under the trade secret laws (which require secrecy) and under the patent laws (which require public disclosure in the patent). The CAFC affirmed the district court's holding that the patent was invalid for failure to comply with the enablement requirement of section 112.¹⁵⁸ Although the result in *White* was harsh, the facts of the case are unusual in view of the patentee's intentional concealment of the best mode of carrying out his invention. At most, the *White* decision serves only as an exception to the general rule stated in the *Sherwood* case.

While *White* provides a grim reminder to those who do not wish to be forthcoming in their patent disclosures, the general rule, as expressed in *Sherwood*, is that failure to disclose the computer program in a patent specification is not fatal, as long as the patent contains sufficient information, narrative or otherwise, to enable a programmer of reasonable skill to implement the invention without undue experimentation.¹⁵⁹ Moreover, *White* does not prohibit a patent owner from maintaining a computer program (properly disclosed in a patent application) as a trade secret during the pre-issuance pendency of a patent application.¹⁶⁰ Consequently, the program owner can enjoy trade secret protection of the program during the two or three years of Patent Office pendency, and upon allowance of the application, can either choose to disclose the program to the public by issuing the patent protecting the program, or otherwise choose to continue to maintain the program as a trade secret by abandoning the application. The decision can be made in light of the breadth of the claims allowed by the Patent Office. In that sense, both trade secret protection for a limited term of two or three years and patent protection for the following seventeen-year term are available to the program owner.

Notwithstanding the latitude of permissible disclosure provided by *Sherwood*, and with due regard for the difficulty of explaining complex subject matter to a judge without technical expertise or a jury of laypersons, prudence suggests disclosure in the patent application consisting of the following:

- (1) a step-by-step narrative of the functions of the program in terms which could be explained to a non-technical judge or a jury of laypersons; and
- (2) source code in a common computer language, preferably the language of the best mode. Object code or machine language would not appear to be necessary unless the invention related directly to it.

156. See *White Consolidated Industries*, 214 U.S.P.Q. at 824.

157. See *id.* at 823.

158. See 713 F.2d at 792.

159. See *In re Sherwood*, 613 F.2d at 817.

160. See 713 F.2d at 791.

Such a disclosure will both facilitate an understanding of the subject matter of the program on the part of the trier of fact at trial, and avoid completely the necessity of litigating any sufficiency of disclosure issues under section 112.

III. INFRINGEMENT OF COMPUTER RELATED PATENTS

The patent infringement statute,¹⁶¹ defines three categories of infringement. These are:

1. *Direct Infringement* by one who "makes, uses or sells any patented invention."¹⁶²

2. *Contributory Infringement* by one who "sells a component of a patented machine ... or material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of the patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use...."¹⁶³

3. *Active Inducement of Infringement* by one who "actively induces infringement of a patent."¹⁶⁴

The patents discussed above include the software with method claims at issue in the *Diehr* case, and the software with machine claims at issue in the *Bradley* case. The method or machine nature of the claims controls the application of the infringement statute.¹⁶⁵ With respect to direct infringement of method claims, a method is practiced and therefore the patent infringed when a computer operates under the control of the program to perform all of the computational, processing and/or physical steps recited in any claim. Performance of fewer than all of the steps of the method will avoid direct infringement.¹⁶⁶ With respect to direct infringement of machine claims, a machine is made and therefore the patent infringed when a computer program is loaded into the computer and configures the computer in accordance with the structural recitations of the claims. An incomplete configuration will avoid infringement.¹⁶⁷ In either case—method or machine—the computer program must be loaded into the computer before a "direct" infringement occurs. Standing alone, the existence of a computer program in the form of a list of instructions, magnetic code on disk or tape, or in the form of solid state devices, such as read-only memory, does not cause the method to be performed or the machine to be constructed.

161. 35 U.S.C. § 271 (1982).

162. *Id.* § 271(a).

163. *Id.* § 271(c).

164. *Id.* § 271(b).

165. The method or machine form of the claims, however, has no substantive effect on the statutory subject matter issue. See Paine, Webber, 564 F. Supp. at 1366.

166. For a discussion of the elements of proof of direct infringement, see CHISUM, 4 PATENTS § 18.03[4], at 18-31 (1984).

167. *Id.*

It is a simple matter to prove that a user of a patented program is a direct infringer, although proving operation or reconfiguration of a machine under the control of software may be more difficult. In *Decca Ltd. v. United States*¹⁶⁸ a patent owner brought suit against the United States alleging patent infringement based upon the Government's use of an "Omega System," a very low frequency radio navigation system used for ship and aircraft navigation.¹⁶⁹ The patent claims were written in apparatus form, and included limitations expressed mathematically concerning the phase relationships of signals broadcast from different stations.¹⁷⁰ Although the Court of Claims found that the patent claims read literally upon the Omega System,¹⁷¹ the Government argued that it committed no infringement because its system employed neither the same means nor achieved the same end result as did the plaintiff's device.¹⁷² The Government argued, *inter alia*, that it used a general purpose digital computer while the plaintiff's patent relied upon an analog system, and that it was the computer software that actually performed the calculations, which constituted "nothing more than a set of equations."¹⁷³

The *Decca* court found little credence in the Government's position. It rejected the Government's argument that digital techniques avoided the analog patent, observing that the claims were not so limited and that the specification of the patent characterized the receiver in broad terms and was not limited merely to analog embodiments.¹⁷⁴ The *Decca* court also rejected the Government's argument that the calculations performed by the software were mere equations.¹⁷⁵ Although the Court of Claims characterized the *Benson* case as holding computer programs unpatentable per se, it refused to construe the claims as covering only computer software.¹⁷⁶ The court observed the other aspects of the claims and found the Government liable, noting that the particular mathematical filters required by the software must be used in conjunction with a receiver, an apparatus for processing the signals received, as well as with other apparatuses, all of which were tangible.¹⁷⁷

As regards most software, however, filing suit against each user of a program is impractical. Therefore, a plaintiff may wish to enjoin the sale of the program to stop present infringement, while also seeking compensation for past infringement. The question this raises, however, is what are the bases

168. 544 F.2d 1070 (Ct. Cl. 1976), *cert. denied*, 454 U.S. 819 (1981).

169. *See id.* at 1075.

170. *See id.* at 1079.

171. *See id.*

172. *See id.*

173. *Id.* at 1080.

174. *Id.* The applicant in *Decca* made no best mode argument, therefore the analog version was presumably the best mode at the time the application was filed. *See id.* at 1077.

175. *See id.*

176. *See id.* Claim 1 in *Decca* included a first and a second station, each of which emitted three signals in certain known relationship with the other, as well as a receiver which included an apparatus for switching among the signals and providing information regarding the phase difference among the signals. *See id.* at 1079.

177. *See id.*

upon which one may sue the seller of a program who sells the program to others who subsequently directly infringe? Because a patented invention is not made or used until the applicable computer program is loaded into the computer, one who merely sells the program will usually not be a direct infringer. Often, however, the seller of a program is also the developer of the program. During the development of the program, there is likely to be use of the program and hence, direct infringement.¹⁷⁸ Moreover, the seller of a program will often demonstrate and/or service the program. By conducting these activities, the seller will render himself a direct infringer.

In situations in which no direct infringement has occurred, a plaintiff may nonetheless be able to allege a cause of action for contributory infringement under section 271(c) of the Act. The infringing act in this situation is the sale of the "component" of the patented machine or the "material or apparatus" used in the patented method.¹⁷⁹ Section 271(c) provides that the party selling the component (or material or apparatus) is liable as a contributory infringer only if the party knows that the component is "especially made or especially adapted for use in an infringement" of the patent "and not a staple article or commodity of commerce suitable for substantial non-infringing use."¹⁸⁰ The Supreme Court has ruled that section 271(c) requires a showing that the alleged contributory infringer "knew that the combination for which his component was especially designed was both patented and infringing."¹⁸¹

With respect to the contributory infringement of apparatus or machine claims, the program sold by the software vendor, with the exception of a pre-programmed ROM, must be transferred from the medium on which it was sold into the memory of a computer before the program causes the construction of the patented machine. Once transferred to a computer memory, the program becomes a "component of a patented machine."¹⁸² In other words, with the exception of a pre-programmed ROM, the thing sold is replicated. The replica is then used as a component of the machine. In the case of a pre-programmed ROM, the patented machine will be made when the ROM is connected to the circuit board of a computer and the computer is turned on.

By way of illustration, consider the person who manufactures and sells a crank shaft to an engine manufacturer. The engine manufacturer does not install the crank shaft sold by that person, but uses it as a template in a duplicating lathe to produce replicas. Thereafter, only the replica crank shafts are installed in the engines sold by the engine manufacturer. The patent is on the engine including the crank shaft. Is the crank shaft seller a contributory infringer? Is he liable for damages as to all engines sold by the engine manufacturer? Consider also the case where the first person sells not a crank shaft,

178. At least one court has held that an experimental purpose coupled with minimal commercial activity will excuse a technical infringement. "[T]here comes a point where what may be literally a wrong, is of too trifling importance to justify intervention of a court." *Condenser Corp. v. Micamold Radio Corp.*, 145 F.2d 878, 880 (2d Cir. 1944).

179. *See* 35 U.S.C. § 271(c) (1982).

180. *Id.*

181. *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 488 (1964).

182. *See* 35 U.S.C. § 271(c) (1982).

but the blueprint of a crank shaft. Would the blueprint seller be liable as a contributory infringer if the blueprint is used to manufacture crank shafts for the patented engine? Would the outcome be any different if a software company does not sell programs for a patented machine or process in program language recorded on a magnetic medium, but rather, in the form of a flow chart or printed source code listing? One could argue that either the flow chart or the printed source code listing is analogous to the blueprint. Needless to say, the analysis of what exactly constitutes contributory infringement under section 271(b) involves issues that have yet to be resolved.

In regard to the contributory infringement of method claims, the crucial question is whether a program in the form of binary code on a magnetic medium is a "material or apparatus for use in practicing a patented process." In this situation an accused infringer could argue that "material" as used in section 271(b) means something physical that is consumed by the patented method, and hence, cannot be a computer program. If this interpretation is correct, the question that follows is whether the program is an "apparatus." A pre-programmed ROM may be considered an apparatus. Moreover, a disk or diskette may also be defined as an apparatus. While it is possible that an argument that the drafters of section 271(b) did not intend to include computer programs within the terms "material or apparatus" may appeal to some courts, such an argument is hyper-technical and should not serve to exculpate an accused infringer who sells programs which cause the infringement of method claims.

If contributory infringement is not present, a claim that the user induced infringement of the patent may be the patent owner's only alternative basis for satisfaction. Under section 271(c), the patent owner must prove that the program constitutes a material part of the invention, that the program was sold by one who knew it to be especially made or especially adapted for use in the infringement, and that the program is not a staple article or commodity of commerce suitable for substantial noninfringing use.¹⁸³ These requirements should be no more difficult to meet in a computer program case than in the conventional contributory infringement case. They may in fact be easier to meet, for it is questionable whether any program would be considered a "staple article." Furthermore, because of the customized nature of programs and the instructions required for their use, to define a program as a "commodity of commerce" requires one to stretch considerably the meaning of that term. Thus, there should be little doubt that the seller of a computer program who sells the program specifically adapted for use in a patented process or machine, and instructs such use in the course of selling the program knowing that the program will in fact be so used, is an active inducer.¹⁸⁴

183. See CHISUM, 4 PATENTS § 17.03, at 17-35 to 17-41 (1984).

184. This is the type of activity for which § 271(b) was designed. Cf. *Burlington Industries, Inc. v. Exxon Corp.*, 379 F. Supp. 754, 757 (D. Md. 1974).

"Inducement," then, under Section 271(b), while requiring active or affirmative steps to be taken with the knowledge of the likely infringing result, otherwise is as

Liability for inducing infringement, however, is dependent upon a showing that the conduct induced is itself direct infringement.¹⁸⁵ It seems likely that the courts will hold liable an accused infringer who sells a computer program that has no significant noninfringing use, even if the seller includes no instructions specifically directing the user to infringe the patent. A closer case would arise when the program has both an infringing use and at least one significant noninfringing use and the seller remains silent as to the manner in which the program is to be used. In all likelihood, a court will look to the extent of the noninfringing use and the intent of the seller, with the ultimate outcome dependent upon the facts of each case. The seller will be expected to show that the suitability for non-infringing uses is actual and substantial.¹⁸⁶ The extent of knowledge or intent necessary to constitute active inducement of infringement under section 271(b) is uncertain.¹⁸⁷ Additionally, because of the problems inherent in enforcing computer program-related patents under sections 271(a) and (c), the previously undeveloped doctrine of active inducement of infringement under section 271(b) could become, for the first time, an important weapon in the arsenal of the patent owner.

If liability for infringement, direct or otherwise, can be established, damages should always be a consideration in selecting the defendants in a lawsuit. To satisfy the statutory subject matter requirement of section 101, most patents involving computer programs necessarily will claim apparatuses or processes beyond the program itself. Consequently, the program is apt to be only one portion of the claimed subject matter, and therefore only one portion of the basis upon which damages can be recovered. To maximize the recovery of damages, it often may be necessary to pursue the persons who combined the computer program with the additional claimed subject matter.

By way of illustration, consider a software house selling a *Bradley*-type operating system to a computer manufacturer.¹⁸⁸ The cost of that operating system may represent the services involved in creating and trouble-shooting

broad in scope as the range of actions by which one may cause, urge, encourage or aid another to infringe.

Id.

185. See *Stukenborg v. Teledyne, Inc.*, 441 F.2d 1069, 1072 (9th Cir.), *cert. denied*, 404 U.S. 852 (1971).

186. See *Fromberg, Inc. v. Thornhill*, 315 F.2d 407, 415 (5th Cir. 1963).

187. It is true that knowledge is not required to establish a claim of direct infringement under 35 U.S.C. § 271(a). . . . It is also true that 35 U.S.C. § 271(c) does require proof of such knowledge. . . . It is not altogether clear that proof of knowledge is necessary under § 271(b). Most courts have held that knowledge is required under § 271(b), . . . however several other factors must be considered. First, § 271(c) does contain the word "knowing", whereas § 271(b) does not. Second, the special circumstances covered by § 271(c) may better lend themselves to a knowledge requirement. . . . Finally, it is widely agreed that the intent of Congress in passing § 271 was to codify the law as it existed prior to 1952. . . . And there is some prior case law supporting the position that knowledge is not required in special circumstances.

Kearns v. Wood Motors, Inc., 204 U.S.P.Q. 485, 490 n. 6 (E.D. Mich. 1978) (citations omitted).

188. See *supra* note 61.

a single program. The computer manufacturer may then duplicate that program for each computer sold. The amount paid to the software house may represent a small fraction of the total sales of infringing computers by the computer manufacturer. Clearly, the potential target for maximum recovery of damages is the computer manufacturer, and consideration should be given to joining the computer manufacturer in any infringement suit.

IV. CONCLUSION

After the Supreme Court's decision in *Parker v. Flook*, the patent bar concluded that few computer program patents would survive the section 101 statutory subject matter test. In the *Diehr* case, the Supreme Court apparently changed direction, albeit by a slim one-vote majority. Although the CCPA and most scholars draw fine lines of distinction between the *Flook* and *Diehr* decisions, it is difficult to consider the *Diehr* case as anything other than an abrupt about-face by a majority of the Supreme Court, as the dissent argued vigorously in *Diehr*.¹⁸⁹ The future for the patentability of computer programs brightened further after the Supreme Court's holding in *Bradley*. The decisions of the CCPA subsequent to *Diehr* and *Bradley* make it clear that the CCPA has welcomed the Supreme Court's change in direction, and the CAFC seems likely to follow. As the law now stands, a practitioner will be remiss if he overlooks the role patent protection can play in securing the computer program innovations of his or her clients.

189. See 450 U.S. at 215-16.