For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents and Trademarks, Petitioner,
v.
Thomas R. JOHNSTON.
No. 74-1033.
October Term, 1975.
December 3, 1975.
ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Reply Brief for the Petitioner

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***1** Respondent's contention (Br. 22-42) that the claimed "invention" is a new machine within the scope of 35 U.S.C. 101 exalts the form in which patent claims are drafted over their substance. If the argument were accepted, this Court's decision in Gottschalk v. Benson, 409 U.S. 63, would be nullified simply by artful claims drafting describing computer programs in generalized "means plus function" terminology, ***2** seemingly like that sometimes used in claims for real apparatus machinery.

Respondent's alleged invention is not a "machine" in any traditional sense, however it is claimed; it is simply a computer program put into a conventional general purpose digital computer. It is thus a machine only in the fictional sense, as can be seen from an examination of the specification and claims in the application.

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[FN1] They disclose not new apparatus, but simply the idea of using existing general purpose computers to maintain individual financial accounts in banks and credit systems, expressed as a computer program.

> FN1. A specification and claim are required by 35 U.S.C. 112. The specification is--
> "a written description of the invention, and of the manner and process of making and using it * * * and shall set forth the best mode contemplated by the inventor of carrying out his invention.
> "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." 35 U.S.C. 112.

A. The specification in petitioner's application, particularly its introduction (A. 3--A. 5) and conclusion (A. 66--A. 67), describes an automatic record keeping system which uses a stored program digital computer to process bank customers' personal and business financial records. It operates by assigning category codes to be marked on the checks and deposit slips of the customer, according to the nature of the transaction. The specification then describes, in detail, a sequence of steps by which a computer may be programmed to operate the system.

Respondent distinguishes, moreover, between programming a general purpose computer to perform the ***3** recordkeeping, and constructing a special purpose computer to do so. His specification points out that "[i]n addition, the principles of this invention are applicable for use with a special purpose computer having all of the control mechanis??ms of the various runs and the files built into the computer in the form of equivalent logic design" (A. 66). Nonetheless, it continues, "the stored-program form of the invention described above is preferred in that it is comparatively much less expensive and more compact" (A. 67).

Finally, the specification supplies, as an example of "the best mode" required by 35 U.S.C. 12, "a printout of a complete program of one form of this invention for use in the IBM 1400-series computers" (A. 67), in a conventional computer language, Autocode, and states that "the program when assembled into the machine language for said IBM computer, controls and directs the operation of that computer in accordance with the invention * * *" (ibid.)

The foregoing, as the court below recognized, obviously describes nothing more than a computer program for providing financial statements to bank customers containing individual accounting details derived from category codes for particular transactions. [FN2]

> FN2. In determining whether respondent's invention constituted statutory subject matter the court below stated (Pet. App. 13A; second emphasis added):
> "Such machine systems, which comprise programmed digital computers, are statutory subject matter under the provisions of § 101 * * *."
> Judge Rich, in dissent, agreed with the majority's characterization, stating that we all know "the invention to be a new program" (Pet. App. 19A).
> Moreover, respondent has conceded that the invention was "reduced to practice in software form of computer programs" (ibid.) and "is being sold as a computer program to banks and to other data processing companies" (ibid.).

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***4** B. The claims (A. 107--A. 109) "point out and distinctly claim" under Section 112 only the idea of using categories to maintain individual financial records. They are broadly phrased to include any data processing systems, consisting of the equipment conventionally utilized in general purpose digital computers (memory, processor for combining and comparing coded signals, in-put and out-put devices, and a control system), when operated by the sequence of steps respondent utilizes to produce category totals for individual accounts. The claims, however, are not on their face limited to demand-deposit banking accounts, and the specification expressly states that it is not so limited (A. 65).

Respondent's claims that the subject matter thus specified and claimed are a process--"a new use of a known * * * machine" (35 U.S.C. 100(b)), i.e., the general purpose digital computer--were abandoned in the court below following this Court's decision in Benson (Pet. App. 2A n. 1). Thus the only issue is whether a computer program can be claimed as a machine under the legal fiction that for purposes of 35 U.S.C. 101, the combination of a stored program and a general purpose computer creates a new special purpose computer. [FN3]

> FN3. Although the respondent's own specification distinguished between general purpose and special purpose computers (A. 66), he now asserts in this Court that he has invented a new "special-purpose computer which is preferably constructed with a stored program and a general-purpose computer" (Resp. Br. 23).

***5** C. As Judge Rich correctly noted below, there is "no realistic distinction in kind between the Benson et al. invention and the invention here" (Pet. App. 21A). Both cases involve attempts to patent a computer program; both, in effect, involve attempts to patent an idea (one a mathematical idea and the other an idea for a method of doing business); and, in each case, the alleged invention has no practical application except when it is used in a digital computer. Respondent's attempted distinction between the forms of the claims--the process claims of Benson and the machine claims of Johnston--is without rational significance. As Judge Rich observed (Pet. App. 20A), and as is shown in Pet. App. D, a trivial modification of the Benson claim language converts such claims into "machine" form. Certainly, Benson involved more than the formalities of claim drafting. It looked to the substance of the patentability of computer programming.

Respondent's patent claims are no more limited to a particular art or technology, or directed to tangible machinery, than the Benson claims were or would be if they were redrafted into this same, fictitious "new machine" format. The respondent's specification and claims no more describe a "new machine" than would Benson's if restated in machine form (Pet. App. D). In its "best mode" the "discovery" is simply an old IBM computer into which respondent has inserted a new computer program. Respondent's contention (Br. 42) that a "machine is not an idea" begs the issue. Regardless of how his claims are ***6** drafted, respondent has invented no hardware and uses only IBM's old hardware without any machine improvement of his own.

Respondent's complicated explanation of the circuitry of a programmed computer (Br. 29-34), and his labelling of a digital computer as a mere "storehouse of parts" (Br. 34), both fail to overcome the basic fact that this computer program is intended to

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provide, and is saleable only because it provides, a new use for the existing machines that the customers already possess. And that is what this Court in Benson held could not be patented. All complex machines are storehouses of parts, but they are parts which can be used for a purpose. Respondent has invented no such parts, but at most, only a non-patentable use of the existing parts. He has "constructed" no machine, but has simply proposed a switching arrangement amount the finite number of circuits available in existing general purpose digital computers. [FN4]

> FN4. The general purpose digital computer is specifically designed to perform a wide variety of data processing tasks. That is its function--its raison d'etre. It is the function of the computer program, within the structural limitations inherent in the computer employed, to direct the computer to process data in a specific way. A program is basically a switching arrangement among available electronic pathways, analogous to the switching system in a railroad yard. See Murphy, 1 Basics of Digital Computers, p. 80 (1958). Thus, pragmatically, whenever a new program is developed it represents a new use for the standard, general purpose digital computer.

3. Respondent is incorrect in the contentions (Br. 37-41) that hardware or wired circuitry for programming or equipping special purpose computers ***7** (which are not reprogrammable without rewiring them) and software programming for general purpose computers (which may be reprogrammed without rewiring them) are fully equivalent, and that since hardware-equipped, special purpose computers are recognized to be patentable machines then it follows that software-programmed computers must also be. Even if a general purpose digital computer is programmed to perform the same tasks as a specific-purpose, unprogrammable computer machine, the two are not the same under 35 U.S.C. 101, because they do not employ "the same or equivalent machine means." Digitronics Corp. v. New York Racing Association, Inc. (Docket No. 67 C 1119, E.D. N.Y., decided September 16, 1975), slip op. 213. [FN5] They are two different methods or means of obtaining the same end result__the first, by building a new hardware machine; the second, by putting an existing hardware machine to a new use. Id. at 212. A new use of an old machine is simply not a new machine; Congress made this ***8** clear in expressly providing for the patenting of new uses as processes, not as machines (35 U.S.C. 100(b)).

> FN5. In Digitronics, the court held that a general purpose digital computer programmed to perform the same function as a patented, special-purpose machine does not infringe the patent on the machine. Slip op. at 212. The court noted (id. at 213):
> "The programmed general-purpose digital computer * * * does the same tasks but not by the same or equivalent machine means. Rather it performs the tasks--putting it most favorably to plaintiff--by a new use of a known machine and that is a process under 35 U.S.C. 100(b)."

In any event, in the instant case, use of wired computer circuitry (instead of software programming) is without substantial practical application, as the specification observes (A.67), for it would destroy the versatility of the general purpose computers rented or otherwise employed by the banks (see Pet. Br. 32-34). The argument thus does not apply to the computers used here.

Finally, the argument is based on a non sequitur. Even if wired computers

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functioned similarly to software-programmed computers, it would not follow that Congress could not make the former patentable and the latter unpatentable, or even that it was irrational to do so. In economic regulation of this kind Congress must always strike a balance and draw dividing lines. See Goldstein v. California, 412 U.S. 546, 569-570. Certainly, on the one hand to allow "new machine" patents on newly-built machines only, and on the other hand to permit no more than method patents on new uses of old machines that function similarly to newly-built machines (when directed in a particular new way to do so)--is to strike a rational balance between the rights of owners of old machines (cf. Aro Mfg. Co. v. Convertible Top Co., 365 U.S. 336, 342-343) and devisers of new ways to use them. [FN6]

FN6. Significantly, the Report of the President's Commission on the Patent System, p. 13 (1966) concluded that "creation of programs has undergone substantial and satisfactory growth in the absence of patent protection and that copyright protection for programs is presently available." Benson, supra, 409 U.S. at 72.

***9** Striking such a balance is all the more rational when there is taken into account the fact that the owner of a "machine" patent (unlike the owner of a "method" patent) can lawfully require the would-be user to purchase the necessary machinery from the patentee or his designee. Compare 35 U.S.C. 154, 271, with B.B. Chemical Co. v. Ellis, 314 U.S. 495; Leitch Mfg. Co. v. Barber Co., 302 U.S. 458. Thus, the owner of a "new machine" patent based on a computer program presumably could, if such patents were allowed, compel the purchase of the computer from him or his designee as the condition for use of the program.

4. Respondent contends (Br. 58-64) that a holding that his claims are nonstatutory under 35 U.S.C. 101 would deprive him of his constitutional right under the Fifth Amendment to equal protection of law, stating that "Equal Protection Requires that Respondent's Machine Invention Be Given the Same Patent Protection Afforded any New and Unobvious Machine." This contention is unfounded.

First, the application involves only a computer program useful for implementing a business idea, not a new machine under 35 U.S.C. 101. Next, respondent has no constitutional right to receive a patent for a "discovery" falling outside the scope of 35 U.S.C. 101. Article I, Section 8, grants Congress the power "To promote the Progress of Science and useful Arts by securing for limited Times to * * * Inventors the exclusive Right to their * * * Discoveries." Congress is given broad discretion to determine when "the Progress of Science and useful Arts" is best served by a grant of exclusive rights to discoveries (see Gold***10** stein, supra), and what types of discovery should be included within the definition of patentable subject matter in 35 U.S.C. 101. If changing technology has overtaken its definitions, it is for Congress to strike the new balance between public availability of existing technology, and private reward for creativity. Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156; Teleprompter Corp. v. Columbia Broadcasting System, 415 U.S. 394; Fortnightly Corp. v. Artists Television, 392 U.S. 390. There have been numerous significant "discoveries" (in the non-statutory sense) that fall outside Section 101. [FN7] Congress has so far left computer program ideas (particularly those that are merely computer language translations of ideas for doing mathematics or doing business) in that category.

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FN7. E.g., Faraday's laws of electromagnetism, Gibb's phase law and his discovery of vectors, Einstein's two theories of relativity. Russell's and Boole's discoveries in logic (important in the computer field). See generally Graham v. John Deere Co. 383 U.S. 1, 8-9 and n. 2 (quoting Thomas Jefferson on ideas).

5. Respondent (Br. 55-56) and amicus American Patent Law Association (Br. Amicus Curiae for Am. Pat. L. Assn. 7-10) each contend that the Commissioner has set forth an incorrect standard of patentability (see Pet. Main Br. 22) that improperly extends this Court's decision in Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, beyond the field of biological and similar natural phenomena. In Benson, however, this Court made it clear that the standard of patentability set forth in Funk is not so limited ***11** as respondent would have it (409 U.S. at 67-68, emphasis added):

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. As we stated in Funk Bros. Seed Co. v. Kalo Co., 333 U.S. 127, 130 "He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end." We dealt there with a "product" claim, while the present case deals with a "process" claim. But we think the same principle applies.

In the present case the respondent's alleged "discovery" or "invention" clearly falls within the class the Court considered in Benson. It is simply an abstract concept, a method of doing business, the idea of having banks provide their customers with certain bookkeeping services that the customers would otherwise have to do themselves. This business idea is analogous to the idea of providing customers with a drive-in movie, considered in Loew's Drive-In Theaters v. Park-In Theatres, 174 F. 2d 547 (C.A. 1), in which the court adopted the same reasoning as Funk and concluded (id. at 551, emphasis added):

The basic question in this case as we see it is whether, given the idea or conception of an open-air drive-in theatre, an exercise of the inventive faculty was required to devise the means for carrying it out. For it is elementary ***12** that however new and useful, or even revolutionary and beneficial to humanity, an idea may be, it is not of itself patentable.

Neither Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45, nor United States v. Adams, 383 U.S. 39, suggests a different result. In Eibel the prior art machinery employed in the paper industry could not be successfully operated at high speeds without producing defects in the paper, and the technological cause for this mechanical difficulty was unknown. Eibel discovered the mechanical cause of the defect, which no one else had been able to do, and how to build into machines a change which eliminated the problem. "It was the discovery of the source [of the trouble] not before known and the application of the remedy for which Eibel was entitled to be rewarded in his patent" (261 U.S. at 68). In the present case, all we have is respondent's recognition that it might be profitable for banks to add, as an adjunct to their existing checking account business, the service of classifying checks and deposit slips into specified categories, plus respondent's devising conventional means of implementing this idea.

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In Adams the discovery was that a magnesium-cuprous chloride battery could operate with water for the electrolyte and furnish "the first practical, water-activated, constant potential battery which could be fabricated and stored indefinitely without any fluid in its cells" (383 U.S. at 43). The case did not concern statutory subject matter under Section 101, but whether the invention lacked novelty under 35 U.S.C. 102(a) and was obvious from prior art (35 U.S.C. ***13** 103). Adams did not, as did respondent, discover an idea whose implementation, "given the idea" required no "exercise of the inventive faculty * * * to devise the means for carrying it out" (Loew's, supra). Nothing in Eibel or Adams in any way detracts from Funk, because they do not remotely involve the aspect of Funk that this Court relied on in Benson and on which we rely here.

CONCLUSION

For the reasons stated in petitioner's main brief and this reply brief, the judgment of the Court of Customs and Patent Appeals should be reversed.

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• 1974 WL 175938 (Appellate Brief) Reply Brief for Petitioner (Oct. Term 1974)

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents and Trademarks, Petitioner,
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Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
October 16, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals

Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA)

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***1** The Association of Data Processing Service Organizations, Software Industry Association, files this brief amicus curiae in opposition to Petitioner, and also files letters of consent of the parties in accordance with the Rules.

***2** QUESTIONS PRESENTED

1. Whether the writ of certiorari should be dismissed in a case in which the record is inadequate, there is a jurisdictional barrier to the consideration of a central issue, and the principal question for which certiorari was requested cannot be resolved?

2. Whether an otherwise patentable special-purpose machine becomes unpatentable solely because it is constructed by programming a general-purpose computer?

INTEREST OF AMICUS CURIAE

Association of Data Processing Service Organizations, Software Industry Association (hereinafter ADAPSO/SIA) is a nonprofit trade association of 62 companies in the computer field, [FN1] approximately 70% of whom concentrate their attention in the software products industry, and the remainder largely in the furnishing of varied software services to computer users and to hardware manufacturers.

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FN1. ADAPSO/SIA (ADAPSO/Software Industry Association) was formed by merger in June 1972 of the Software Products and Service Section of ADAPSO and the Association of Independent Software Companies (AISC), the latter comprising 8 companies and the former 25 companies.

ADAPSO/SIA presents its views to the Court because an inaccurate description of software technology and the software products industry has been set forth by Petitioner's Brief and the supporting brief of the hardware manufacturers' association, CBEMA.

ADAPSO/SIA companies are not "idea or think tanks." They are companies engaged in building and marketing machines for which profit-conscious companies will and do expend money. ADAPSO/SIA's members believe they are entitled to the same patent protection for their innovative products as that granted the hardware manufacturers.

***3** NATURE OF THE INDUSTRY

A. THE ABSENCE OF COMPETITION IN SOFTWARE.

Whereas ADAPSO/SIA is an organization of relatively small companies, with no one company exerting dominance over all the others, CBEMA is an organization of relatively large companies, operating in a computer hardware industry "shaped and dominated by IBM." [FN2] IBM's dominance is such that its 70% or better share of the computer hardware market is nearly ten times that of its nearest competitor, Sperry-Rand. [FN3] Other giant companies such as Honeywell, Burroughs, Control Data and National Cash Register are compelled to share the remaining portion of the market; General Electric and RCA found themselves forced to withdraw entirely from competition. Thus, it is IBM's voice and actions which have and which do dominate the computer industry.

FN2. Government's Pretrial Brief, U.S. v. IBM, 69 Civ. 200, S.D.N.Y. (hereinafter Pretrial Br.)

FN3. See Report, Brooks Subcommittee on H.R. 4845, Aug. 17, 1965, 89th Cong. 1st. Sess. (House Rep. No. 802) "Domination of ADP Industry by IBM," p. 11.

In this case the Government remains silent while CBEMA distorts the history of the computer industry to assert that "the computer industry has developed in an atmosphere of free interchange of computer programs...." [FN4] How "free" the atmosphere has been in the computer industry is best shown by the Government's pretrial brief in United States of America v. International Business Machines Corporation. [FN5]

FN4. CBEMA Brief 10-12.

FN5. Pretrial Br. supra.
See also Berteau, "IBM and the Structure of the Industry, The Software Monopoly, 21 Datamation 111, October, 1975:
We have seen hardware technology continue to advance at a rapid pace but the systems architecture seems to stay the same. Have you wondered why? The answer is software. As long as the structure of system software is fixed, innovation

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> in system architecture is limited....
> The most significant reason for this situation probably lies in the history of software building by manufacturers. It's just not in the manufacturers' interest to produce optimum system software. It might result in the manufacturer selling less iron....
> The solution to the software building problem brings us to a real issue facing the industry today--monopoly and restraint of trade in software. We have a small but significant competitive market in applications packages. There is very little competition in sorts and compilers, almost no competition in data communications access methods, and no competition in operating systems. And unless the U.S. antitrust lawyers understand the significance of this, we'll have even less competition in the future.
> The author is identified by the magazine as "a holder of one of the early software patents."

***4** The Government in its antitrust action against IBM notes the development of the computer industry and finds that in "the earliest days of the development of the computer industry, there was nothing that could be identified as a software industry." [FN6] This was in part because users design some of their own software and because the "computer systems manufacturers, following IBM's lead, provided [free] much of the software [that] users required." [FN7]

> FN6. Pretrial Br. 28.
>
> FN7. Pretrial Br. 28.

It was not until the late 1960's that "the independent software products market emerged, pioneered by the firm Applied Data Research, Inc.," [FN8] one of the amici herein. As the Government notes, "in light of the fact that IBM provided its customers with their software requirements as part of the IBM 'total systems solution,' independent software product firms had to market their offerings against products for which there was no identifiable price. As a result, only those companies which could offer products not available 'free' from IBM or which could demonstrate the technological superiority of their products in comparison to IBM's had any chance of survival." [FN9] The result was that ***5** the independent software product firms lacked "a realistic opportunity to compete." [FN10] That this was not an innocent case of cause and effect was shown by IBM internal memoranda which revealed that "the value of this exclusionary effect derived from bundled pricing [so-called free software] [FN11] was fully appreciated by IBM ... The effect of IBM's ability to wield such exclusionary power has been felt most acutely ... by those firms seeking to market software products." [FN12]

> FN8. Pretrial Br. 28.
>
> FN9. Pretrial Br. 29.
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> FN10. Pretrial Br. 29.
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> FN11. The Commissioner of Patents punctured this boasting of free software in 1968: "Today, the only significant free contribution of software to the public comes from the universities and other organizations dedicated to research

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rather than profit." Brenner, Commissioner of Patents, "The Future of Computer Programs in the U.S. Patent Office," Law of Software, 1968, pp. B-1, 3.

FN12. Pretrial Br. 201.

The Government has also noted that "IBM internal memoranda ... reflect that from as early as 1965, IBM was aware of the marketing benefits derived from bundled pricing and the anticompetitive effect it had on software companies." [FN13] The net effect was that "bundled pricing enabled IBM to exclude competition from independent software vendors." [FN14]

FN13. Pretrial Br. 205.

FN14. Ibid., 207.

The Government concludes that its study of IBM documents "illustrate without ambiguity that its bundled pricing marketing approach was a practice known by IBM to be legally indefensible. Nevertheless, IBM consciously continued bundled pricing because of the competitive leverage it afforded IBM in maintaining its monopoly position." [FN15]

FN15. Ibid., 236.

Software monopolies are also maintained by other hardware manufacturers through the use of bundling. A small software company has sued Sperry Rand, charging it with refusing to place a price on its bundled software and thereby making it impossible for the small company to sell ***6** its software in competition. [FN16] Honeywell in bundling its software and hardware asserts that the software is "free." But when the hardware buyer attempts to transfer that software along with the hardware to another company, Honeywell claims that it owns the software and will control who can have possession. [FN17]

FN16. Computerworld, November 20, 1974, p. 45.

FN17. Computerworld, August 6, 1975, p. 1.

B. THE RESULTING POOR-QUALITY SOFTWARE.

The CBEMA brief also boasts of "The tremendous growth of the computer software industry and the vast number of breakthroughs in the field of programming, which have occurred in the last two decades" (CBEMA Br. 12). How different the facts really are in the computer software field is made clear by the testimony of Dr. Ruth M. Davis, Director of the Center for Computer Services and Technology of the National Bureau of Standards [FN18] characterizing the present condition of software as "poor-quality software," a condition which she described as the "crucial computer problem" confronting the nation today. Speaking on the "seriousness of the problems besetting both the consumers of computer products and services and the suppliers of these products and services" Dr. Davis stated:

FN18. Testimony given before the Government Activity Subcommittee, House Committee on Government Operations, May 16, 1972.

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The crippling problems are lining up in the software rather than in the hardware field. In particular, they fall under what we call the application-independent problem category ... these are the software problems which are common to many applications.

That the condition described by Dr. Davis in 1972 still holds true is seen by her warning at the CBEMA Spring meeting, May 29, 1974 that "the difficulty and cost of ***7** developing and maintaining quality software have become the single largest consideration in computer utilization and composes a serious limitation on the cost-effective use of computers."

Even IBM acknowledges that "the biggest problem facing programming today is the extreme difficulty and cost encountered in creating and maintaining large programming systems." [FN19] At the National Computer Conference held early this year it was admitted by a leading hardware manufacturer that the "software dinosaur" has not "kept pace with the technical needs of the industry." [FN20] As a result of the software users being at the mercy of the hardware manufacturers, the users are forced to make do with the "free," poor and technically inferior software. [FN21]

FN19. The IBM report from their Poughkeepsie Laboratory -- "Composite Design: The Design of Modular Programs" Jan., 1973, p. 3.

FN20. "'Software Dinosaur' Slows Growth," Univac Vice President Neil Gorchow, Sperry Rand, Software Digest, Vol. 7, No. 20, May 22, 1975, p. 2.

FN21. "155, 165 Owners Angry With IBM," Datamation, August, 1974, p. 76. The "free" software of the hardware manufacturers has been described by a professional for 24 years in electronic data processing (EDP): "...Con puter systems are in many cases defective. They are primarily defective in the computer programs that come with the hardware -- the body of programs referred to as the 'Operating System' ... a sort of executive in managing the work of the many parts of the computer system, ... [the] housekeeping chores ... [A] very big set of programs [that] is often inefficient, overcomplicated and unreliable ... [t]he outrageous fact remains that the Operating System is often an imperfect and incomplete product which typically contains errors, omissions and inconsistencies. ("EDP -- A 20 Year Ripoff," INFOSYSTEMS, 11/74, pp. 26, 27, 29.)

The reason for the poor state of the development of software lies in the shackles IBM has placed upon free competition. History shows that it has been small technological companies and independent inventors, and not the vast financial combines such as IBM, which have been responsible for much of the innovation of this age. A recent government ***8** report has found that "studies of the sources of invention and innovation have shown that independent inventors and small technologically based companies are responsible for a remarkably high percentage of the important inventions and innovation of this century. [FN22]

FN22. National Bureau of Standards Experimental Technology Inventives Program, Preliminary Program Description, Fiscal Year 1973 Budget Submission, p. 9.

C. THE SMALL COMPANY POTENTIAL FOR COMPETITION.

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The small, mostly "young and struggling", companies who "surely possess excellent technical innovative capabilities" and "the principal technical capability ... to work ... on our critical computer problems" [FN23] have been wrongfully denied the incentive of the patent system, which has been assured to the hardware manufacturers for products they sell. The patent incentive is both a form of recognition and a major aid in obtaining the necessary financing without which these companies face the prospect of shriveling and dying. It is no accident that the monopolistic and exclusionary practices of IBM have permitted only a small number of companies in the software products field to achieve a relative degree of success. As the Government states in its pretrial brief "operating systems continue to be part of IBM's bundled price structure. These continue to be bundied for the marketing leverage they afford IBM in terms of increasing the sale of IBM computer equipment and forestalling the growth of independent software companies." [FN24]

FN23. Davis, Committee Testimony, p. 15, supra.

FN24. Pretrial Br. 226.

D. THE IMPORTANCE OF PATENT INCENTIVES.

A patent on a software program creates an economic toehold in the monopoly-dominated computer field. The software products company characterized by the Government as the pioneer in the independent software products ***9** market, Applied Data Research, Inc., [FN25] stands as proof of the importance of software patents. [FN26]

FN25. Pretrial Br. 28.

FN26. See ADR Amicus Brief filed herein.

To a large financial giant, the economic value of a patent may not loom large; to the small software companies upon which the future of the development of quality software depends, the financial value of the patent may spell the difference between life and death. To banks and financial institutions the existence of a patent or even the potentiality of obtaining one may well be a decisive factor in determining whether a loan should be granted. To prospective investors a patent or the possibility of obtaining one may be the principal element in the decision whether to invest.

Making clear that patents may be available for inventions in software would unleash enormous innovative talent. It would have the direct opposite effect forecast by IBM and the other hardware manufacturers--it would enable competition with those companies and provide the needed incentive to stimulate innovation.

Patent protection would encourage the free dissemination of program innovations which is so necessary to stimulate technological progress. Disclosure is the statutory price paid by the inventor for patent protection. Without such protection inventors principally have to rely on the law of trade secrets in order to secure the economic value of their inventions, thereby excluding from the world-at-large disclosure of the invention.

When the Patent Office for its own convenience [FN27] urges that inventors rely on

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trade secrets in lieu of patents, ***10** it is ignoring the mandate of the Patent Laws, and when it urges copyrights as another potential alternative, it is denying the inventiveness of an entire technology, thus abdicating its responsibility under the Patent Laws to grant patents for machines that "advance the Progress of the useful Arts."

> FN27. In 1966 the Patent Office issued Guidelines which based upon the facts of the technology, provided for the patentability of computer program inventions "Guidelines to Examination of Programs," 829 Official Gazette, 441, 442, July 6, 1966. In 1968, the Patent Office issued a set of Revised Guidelines, "Guidelines to Examination of Programs," 855 Official Gazette, 829, 830, October 22, 1968, based upon "policy" (i.e., not legal reasons) limiting severely the grant of patents in this area on grounds of administrative convenience, Brenner, Law of Software, supra, B-12.

Such computer programs as are freely disclosed in the trade literature of the computer industry have little economic value or technological worth. All that this kind of "free exchange" has produced for the computer industry has been "crippling problems" and "poor quality software." The real strides forward in computer development occurred in hardware, an area fully protected by the patent laws. In a competitive economy, that which is given away for nothing tends to have the same value. Non-profit companies are non-existent in the computer industry. CBEMA favors its version of "free interchange of programs" because that has been one of its major techniques in excluding competition and in monopolizing the computer industry. It is profits and not "free interchange of programs" or "innovative software that CBEMA seeks.

The economic forces opposed to patent protection were clearly identified by Judge Rich in his dissenting opinion below. As he stated it:

On the one side ... against patenting programs or software [were] collective forces of major hardware (i.e., computer) manufacturers and their representative associations who, for economic reasons, did not want patents granted on programs for their machines. (Emphasis in the original.)

This portion of Judge Rich's "dissent" (a dissent whose purpose was to provoke this Supreme Court review to ***11** obtain a ruling providing for software patents) [FN28] is ignored by the Government as is the fact that Judge Rich reaffirmed his view as to the soundness of his previous opinions on computer technology.

> FN28. Rich, "Change," 2 APLA Quarterly Journal 214, American Patent Law Association, Fall, 1974): "I do not see how the Patent Office can avoid at least trying to get certiorari granted in Johnston. as I implied in my dissenting opinion, in which, by the way, I do not abandon my personal beliefs about what § 101 means, as expressed in the C.C.P.A. Benson opinion, ..."

When one knows that every action taken by IBM has been motivated by its monopolistic and exclusionary desires, one understands why IBM has led the legal fight against patents for software. It is not to strengthen the computer industry but only to strengthen IBM's stranglehold upon it that IBM postulates its legal theories in opposition to patents. Strange indeed is it that the Government despite its firsthand knowledge of IBM's efforts aimed at "forestalling the growth of

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independent software companies" [FN29] joins hands herein with IBM in furtherance of IBM's monopolistic endeavors.

FN29. Pretrial Br. 226.

To arbitrarily deny patent coverage as urged herein by the Patent Office is to denigrate software technology and to cast a chilling effect upon inventiveness.

***12** SUMMARY OF ARGUMENT

The writ of certiorari should be dismissed as improvidently granted, because of the inadequate record, the jurisdictional barrier to the reconsideration of a central factual issue, and the inappropriateness of the principal question for which certiorari was granted. To consider what the Patent Commissioner presents as the key issues in this case would require this Court to undertake a thorough inquiry into the complex technological issues of special-purpose computer construction, but the record does not provide the factual basis which would enable the Court to do so. The Supreme Court is not the appropriate forum for initial fact finding.

The most basic technological issue -- the Board of Appeals' finding that programming a general-purpose computer restructures the computer into a different machine--is not jurisdictionally subject to review because 35 U.S.C. § 141, et seq. bind the Commissioner of Patents by Board determinations. Since the Board is the alter ego of the commissioner, his attempt to appeal its finding is in essence a nonjusticiable intra-agency dispute. Moreover, the C.C.P.A. and the Board have considered the basic technological fact issue, each has special credentials of technological expertise and both have found in favor of the restructuring principle.

The broad question for which certiorari was granted--whether innovative machines which can be embodied in computer programs are patentable subject matter--is inappropriate for judicial resolution in this case because patentability depends on the structural nature of the specific invention not which of alternative types of construction was employed. The petitioner has conceded that the Court cannot formulate a rule of general applicability in its decision of this case and that the only other question presented--obviousness under 35 U.S.C. § 103--is not worthy of this Court's attention.

The petitioner's main legal arguments depend on a mischaracterization of computer program technology. An ***13** accurate picture of this technology reveals that a programmed general purpose computer is a different machine than the unprogrammed machine. The designer of software, like any engineer, builds machine structures, not methods of doing business; he develops machine solutions for machine problems. Computer innovations embodied with stored computer programs are legally entitled to the same patent protection as innovations embodied in wire-connected electronic circuits, for technologically "hardware" and "software" are equivalent.

The facts that a programmed computer (what respondent defines as his invention) is a machine and the innovative aspect of it is a machine structure cannot be overcome by petitioner's legal arguments. A machine is not a method of doing business. An innovative machine structure is not the mere embodiment of an abstract idea. Machines are patentable subject matter and respondent's only argument against software being patentable subject matter is the unsupported statement--appealing

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perhaps to a layman but universally rejected by the experts--that a program is not a machine but merely an idea, "new use," or "method of doing business."

Patent protection for software is vital to the health of the data processing industry. In a field dominated by IBM, the growth of the small independent software company has been stifled by the bundling practices of the hardware manufacturers which continue to this day in the systems programs area. Only through the availability of protection for their products can the software producers hope to bring competition to an industry that sorely needs it.

The absence of patent protection has forced reliance on trade secrecy and has had the negative effect of deterring disclosure of innovations. The availability of patents, with their public disclosure requirement, would "promote the progress of the useful Arts," in this most sophisticated, pervasive and vital area of technology.

Copyright protection is inadequate and inappropriate to protect innovative machine structures. Copyright of a ***14** particular set of computer language statements does not protect the novel machine structure that is the core of any software invention. The Constitution establishes innovation as the prerequisite for a grant of exclusive rights to machine structures; attempts to protect them via copyright or registration run counter to this principle.

At stake in this case is equal patent treatment for the products of small software companies. The myth perpetuated by the Government and CBEMA -- that computer-program embodied inventions are not machine inventions--has been exploded; there is now no justification for the denial of patent protection to software-embodied machines.

***15** I. THE WRIT OF CERTIORARI SHOULD BE DISMISSED.

A. The record in this case is insufficient to permit consideration of the questions presented by the Government.

This Court is being asked by the Patent Office to rule on important factual issues concerning the technology of computers and computer programs. There is no record below that develops the nature of this technology. The Patent Office has not tendered to this Court or to the Court below any technological evidence supporting its position, nor could it seek to introduce any such evidence at this stage of the proceeding. [FN30] Since the record "is insufficient to permit decision of [the] claims," [FN31] the writ of certiorari should be dismissed, see Massachusetts v. Painten, 389 U.S. 560.

FN30. See 35 U.S.C. § 144, which limits the C.C.P.A. to deciding the appeal "on the evidence produced before the Patent Office."

FN31. Johnson v. Massachusetts, 390 U.S. 511.

The major technical fact issues raised by the legal contentions include:

a) Does programming a general-purpose digital computer restructure the computer into a new machine with a different structure? The Patent Board of Appeals, based on

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its technical expertise, [FN32] found that it does (Pet. 28A). The finding was not, nor could it have been, appealed to the C.C.P.A. [FN33] The Patent Office now asks this Court to overturn its own factual finding by arguing that the invention is not a machine structure but a "new use." CBEMA asserts that the invention is merely a "method of doing business." Neither the Patent Office nor CBEMA has offered one iota of evidence to support those arguments.

FN32. See 35 U.S.C. § 7.

FN33. 35 U.S.C. § 141. et seq.

b) Are hardware- and software-built embodiments of the same machine technologically equivalent? The Patent Office's request for a ruling that a software built machine ***16** system is unpatentable solely because it is built in software is at odds with the fact that special purpose computers can be built equivalently in hardware or software. The Patent Office relies only on contrary assertion and metaphor to attempt to justify different treatment under the Patent Code for the equivalent software-built machines, but can show no supporting evidence in the record.

c) Are the innovative aspects of computer programs generally and respondent's invention in particular machine structures? The Patent Office (i.e., the Patent Board of Appeals) held that the invention is a special-purpose machine and a different machine from an unprogrammed general computer. The Patent Office and CBEMA now seek to offer an undocumented view of the programming technology which attempts to characterize programming (i) as an abstract activity unrelated to any specific machine structure and (ii) as a "routine" implementation of abstract ideas or a method of doing business. There are no facts in the record to support the assertions of the Patent Office or CBEMA.

This Court, unlike the two tribunals below, is not specially equipped, in the absence of a record, to deal with the intricate technological fact issues sought to be raised by the Patent Office. [FN34] This Court has recognized that in technical areas it should avoid disturbing the findings below, see Brenner v. Manson, 383 U.S. 519, 532. It is not appropriate to review technological issues without a record. Rather the Court should leave to other "parties whether ***17** or not participants in [this appeal] a further opportunity to contest the matter on plenary records developed in litigation elsewhere...." Glidden v. Zdanok, 370 U.S. 530, 579.

FN34. The Examiners-in-Chief of the U.S. Patent Office Board of Appeals are uniquely qualified by way of training in engineering and science to cope with the technology, see 35 U.S.C. § 7 "... the Examiners-in-Chief shall be persons of competent legal knowledge and scientific ability." Likewise at the C.C.P.A., the judges have the assistance of specially qualified technical advisors with scientific ability. In addition, three of the judges are professionally trained in engineering and science having come out of a patent law back-ground.

B. This Court is without jurisdiction to reverse findings of the Patent Board of Appeals favorable to respondent.

The Patent Office now asserts that programming a general-purpose computer does not

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restructure the machine but is merely a "new use" of the machine. This allegation has no basis, as the Board of Appeals held in a finding binding upon the Patent Office (Pet. 28A). This Court is without jurisdiction to reverse that finding.

The Board accepted restructuring as a technological fact beyond dispute, noting that the contrary view was "invalid." The Patent Office never sought to raise the restructuring issue in the C.C.P.A., nor by statute could the Patent Office appeal from that or any finding of its own Board of Appeals. 35 U.S.C. § 141, et seq. The law is clear that only the applicant and not the Patent Office may appeal from the Board of Appeals to the C.C.P.A. and that the jurisdiction of the C.C.P.A. "extends to and embraces none other than the adverse decision from which appellant has [taken an] appeal." In re Melott, 331 F.2d 887.

28 U.S.C. § 1256 limits the scope of this Court's appellate review to "cases in the C.C.P.A." That section must be read in light of the intent to bind the Patent Office implicit in the jurisdictional limitations of 35 U.S.C. § 141, et seq. [FN35] Because the restructuring issue was not and could not have been in the C.C.P.A. case it cannot be considered by this Court.

FN35. The Supreme Court has found it "appropriate that the Commissioner be bound by Board determinations." Brenner v. Manson, supra, at 523. fn. 6.

The Patent Office attempt to raise its legal theory of "new use of an existing machine" also violates the legal ***18** principle that no matter may be argued at the appellate court level which has not previously been raised before the lower court. That principle has particular applicability in this instance where the C.C.P.A.'s "special competence in complex, technical and important matters," [FN36] would be indispensable.

FN36. Glidden Co. v. Zdanok, 370 U.S. at 560.

Furthermore, the restructuring issue is not justiciable because the Patent Office is in reality seeking to appeal from itself. The Board of Appeals is the alter ego of the Commissioner of Patents and speaks for the Patent Office. [FN37] The Patent Office through the Board of Appeals has ruled that a programmed general-purpose computer is a different machine from an unprogrammed general-purpose computer. The Commissioner seeks to utilize the Supreme Court as an instrument for reversing his alter ego the Board of Appeals. Such intra-agency disagreements are not appropriately resolved by the judiciary. That is the reason the Commissioner by statute has no right of appeal from the Board of Appeals and why this Court must accept the determination of the Board on the restructuring issue.

FN37. See Brenner v. Manson, supra, at 523, fn. 6.

C. The basic question for which review was sought in this case--whether novel and unobvious machines constructed by programming a general-purpose digital computer are patentable--cannot be resolved by a decision in this case and Petitioner so concedes.

This case was presented to the Court as a vehicle for deciding the broad issue of patentability of computer programs. That issue is the focus of both the Patent

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Office certiorari petition and its brief, which ask the Court to fashion the general rule that software-built special-***19** purpose computers are unpatentable subject matter. [FN38] This Court cannot issue such a rule of unpatentable subject matter under § 101, based on the way a machine is built without violating the spirit and letter of the patent statute. Whether a particular machine constitutes patentable subject matter depends on the well-established principles of patent law--not whether the machine is built with one form of construction (software) as against another (hardware).

> FN38. The Patent Office concedes that the remaining specific issue of the patentability of respondent's invention under 35 U.S.C. § 103 is not certworthy, Petition for Certiorari 17, n. 10 (hereinafter referred to as "Pet."; the Brief for the Petitioner is referred to as "Br. Pet.").

This Court cannot rule that all programs are unpatentable any more than it could rule a radio built with vacuum tubes is patentable, but if built with transistors, is unpatentable. The patent statute is broadly drafted, defining as patentable all machines regardless of the technology by which they are built. The only exception of a particular technological field, that of atomic weapons, is explicitly defined by Congress, 42 U.S.C. § 281(a). Even the Patent Office in its reply brief concedes the "possibility of patentability" (R. Br. 2) of some programmed computers thereby negating any general ruling applicable to all programmed computers. Since all parties agree that there can be no answer to the broader question, the writ should be dismissed. [FN39]

> FN39. The dismissal of certiorari would not leave the C.C.P.A. decision as a final adjudication of the patentability of respondent's invention. The validity of any patent that may issue to respondent may be fully attacked in an inter partes proceeding, (see Reviser's note to 35 U.S.C. § 144) where a full record could be developed, see Glidden, supra at 578-79.

The only other basis for decision offered by the Patent Office is the specific issue of the unpatentability of respondent's invention under 35 U.S.C. 103 for obviousness. Petitioner concedes this issue is not worthy of the Court's attention (Pet. 17, n. 10). The Patent Office does not urge that the incorrect legal standard was applied by the C.C.P.A. Instead the Patent Office merely repeats its ***20** factual analysis of the content of the prior Dirks patent, which analysis was rejected by the CCPA. Thus the obviousness issue does not raise "an important question of federal law," (Sup. Ct. Rule 19) nor does the CCPA's mode of fact finding "conflict with applicable decisions of this Court," id. Unable to decide the general issue for which certiorari was sought and granted, this Court should exercise its discretion to decline to review the case and dismiss the writ of certiorari as improvidently granted.

II. SPECIAL-PURPOSE COMPUTERS BUILT BY PROGRAMMING A GENERAL-PURPOSE COMPUTER ARE MACHINES, HENCE PATENTABLE SUBJECT MATTER.

A. The technology of computers and computer programs.

A modern digital computer is an electronic machine that has the capacity to perform various data processing functions. The operation of a computer, like that of any

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automatic machine, is controlled by a program.

A program is a control mechanism which determines that each part of a particular machine system functions as required in order to achieve the desired result. [FN40]

> FN40. In earlier forms of automatic machines, programs "consist[ed] of mechanical parts such as gears, cams, and linkages that connect the various portions of a machine together and determine[d] the timing of the various actions of the machine." In modern computers, the program consists of the states of electronic circuits and "may be stored in the form of punched paper cards, paper tape, magnetic tape, ferrite cores, electronic circuits, or other mechanical or electronic memory devices." 2 New Encyc. Britannica: Macropaedia, 505, 506. "Automation"

A fixed-purpose computer, sometimes known as a "single-purpose computer," has one program physically built into its circuitry and thus can perform one and only one function. The program in such a machine is generally in its circuitry in the form of a configuration of sub-circuits or a predetermined sequence of switches or electronic impulses.

***21** A general-purpose computer, sometimes called a "programmable computer," can perform no function by itself without containing a program, as is true of any automatic machine. [FN41]

> FN41. E.g., an automobile engine without camshaft or distributor cannot function.

Both a general-purpose computer loaded with a particular program and a fixed-purpose computer are referred to as special-purpose computers because they can perform one particular function. The only difference is that the program in the fixed-purpose computer is permanently wired in (sometimes called "hardwired") while the program in a general-purpose computer is stored in the form of the states of electronic circuits (sometimes called "softwiring"). These two forms of construction are generally equivalent and functionally interchangeable.

The phrase "patents for computer programs" as used by the Patent Office to describe the key issue in this case, is technically imprecise and misleading in that what is sought to be protected in this technology is not some abstraction unrelated to a machine, but the structure of a particular special-purpose machine which may be produced by the softwired or programmed general-purpose computer but which also may be hardwired. [FN42]

> FN42. "Program" has two meanings: one as used here is that control structure of a special-purpose computer (formed either by circuit states or configurations) which directs its operation as does the "program" of any automatic machine; the other common usage, not involved in this case, is a symbolic record of those signals in human-readable form, say a list of computer language statements.

The designer of a special-purpose computer is faced with the task of creating circuitry to achieve a particular goal or function. Prior to the advent of the

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stored program for a general-purpose computer, such complex circuitry had to be built by physically wiring the components. The great technological advantage of the stored program concept is that it permits the creation of circuits by the use of electronic signals without requiring externally made physical ***22** connection. Each form of construction for special-purpose computers, softwiring or hardwiring, has its own technological and economic costs and benefits. The choice of which form to use in a given situation is a complex decision based on various engineering and management tradeoffs. [FN43]

FN43. Frequently, the decision is not made until well along in the design process after the basic structure of the special-purpose computer has been determined.

None of the factors concerning the choice of hard- or softwiring has any relation to inventiveness of the underlying machine. If the circuit states and configuration of a particular special-purpose computer contain the elements of invention, the machine is patentable and the fact that the wiring is "hard" or "soft" is immaterial. The interchangeability of these two types of computer construction is summed up in the phrase: "the engineering equivalence of software and hardware."

B. A special-purpose computer built by programming a general-purpose computer is a different machine than the general-purpose computer with its own unique circuit structure.

It is necessary to understand the manner in which programming does in fact restructure the general-purpose computer to appreciate the defect in the Government's argument that a programmed general-purpose computer is not a machine but merely the "new use of an existing machine." Far from being a mere semantic device or legal fiction, the restructuring concept is technological fact. When a program is loaded into a general-purpose computer, a set of circuit states and electric impulses are created which are the control or program of the special-purpose computer. It is because the general-purpose computer is programmable that it may appropriately be viewed as a "warehouse of parts." [FN44] Without a program, the function ***23** circuits of a general-purpose computer neither operate nor co-act in a "dynamic interrelationship," [FN45] they are just like unconnected resistors and transistors on an engineer's workbench. Loading a program brings these function circuits into a synergistic and dynamic relation and structures them just like hardwiring the circuits of a fixed-purpose computer or wiring together resistors, capacitors and transistors to make a radio.

FN44. Patent Office 1966 Guidelines, 829 O.G. 441, 442.

FN45. Br. Pet. 36.

All the evidence supports the factual reality of the restructuring principle. [FN46] The Board of Appeals specifically accepted it in this case (Pet. 28A), and the C.C.P.A. has so found in a long line of decisions. [FN47] The Government by using distorted quotes, making unsupported and unsupportable assertions, and relying on false metaphors, has attempted to mislead the Court to believe the facts are otherwise. [FN48]

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FN46. For a collection of the statements of computer experts see Jacobs, "Computer Technology (Hardware and Software): Some Legal Implications for Antitrust, Copyrights and Patents," Rutgers Journal of Computers and Law, Vol. 1970, No. 8, at 50.

FN47. In re Prater, 415 F.2d 1393 (1969); In re Bernhart, 417 F.2d 1395 (1969); In re Mahoney, 421 F.2d 742 (1970); In re Musgrave, 431 F.2d 882 (1970); In re Foster, 438 F.2d 1011 (1971).

FN48. The Patent Office approach is necessary to its case in the sense that once the fact of restructuring is accepted, the bulk of the Patent Office case -- the argument against the patentability of programmed computers -- dissolves.

The Patent Office Brief presents two positions on the restructuring issue, the first is factual and the second seeks to oppose the first with a legal argument. First, the Patent Office concedes in its brief the facts of the restructuring principle, that without "appropriate controls" a general-purpose computer cannot perform any significant operations, and that

[t]he particular operations to be performed by a computer are governed by the state and configuration of its electronic circuitry .... Such circuitry can be fully built into the computer by wires and other physical ***24** elements (i.e., as part of the 'hardware'), in which case, unless it is physically rewired, the computer will ordinarily serve only a specific purpose or application ....

Alternatively, the computer may be designed so that the state or configuration or its circuitry can readily be changed without rewiring or other visible physical changes. Such changes are accomplished by the use of different 'programs'.... (Br. Pet. 14, 15)

In the above quote, the Patent Office concedes the entire basis of respondent's case by admitting, clearly and concisely, the interchangeability or equivalence of hardware and software. [FN49] The very same structural changes in the state and configuration of the general-purpose computer can be accomplished either by hardware or software. To base disparate legal treatment upon a mode of construction has no justification in law, technology or common sense. Softwired (i.e., wireless) programming is an historic advance over the wired program. The patent statutes and their constitutional base were not intended to be limited to a finite period of technological development. There is no justification for the Patent Office's position that technology has now outstripped the boundaries of patent law.

FN49. CBEMA's Brief amicus avoids mention of the engineering equivalence of software and hardware though its members have used this principle for decades in the engineering of their hardware and software.

Compelled by the facts to admit the interchangeability and equivalence of hardware and software and the basic restructuring principles of the stored program concept, the Patent Office presents a second and completely opposite brief seeking to obfuscate its admission and to divert the attention of the Court from the inescapable conclusion that software is, of course, patentable equally with the hardware. The Patent Office makes three arguments to deny restructuring: [FN50] 1. It quotes out of context Judge Rich's use of the phrase "legal fiction" as it

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pertains to the ***25** legal effects of the drafting of patent claims, distorting his meaning and seeking to confuse this Court into believing that Judge Rich was casting doubt on the technological principles of restructuring. [FN51] 2. It distorts the Board's position. [FN52] If there is any one principle that both the Board of Appeals and the CCPA agreed on in this case, it is the fact of the restructuring principle, applicable to a stored-program computer. The Board of Appeals did not hesitate to remind the Examiner of the facts of computer technology that an unprogrammed or differently programmed computer is not the same machine as the one that results from programming a general-purpose computer (Pet. 28A.) 3. The Patent Office compares a player piano whose components are never restructured to a general-purpose computer whose usefulness is totally dependent upon the restructurability of its circuits (the ability of a stored program to connect its circuits into a desired configuration). The Patent Office's frequent use of this player piano analogy--not accepted by the Court in Benson [FN53]--is inexcusable since it ignores the unique quality of general-purpose computers: without a program they have no function but they can be programmed to connect the elementary circuits of the general-purpose computer into an unlimited variety of new configurations, each generally unrelated to the elementary circuit functions. Only the general-purpose computer, not the player piano, is restructured by a program into a different machine, with a different function.

FN50. Br. Pet. 33-35.

FN51. In fact, Judge Rich has made it clear in his "dissent" and in a subsequent writing (see fn. 28 supra) that he has not retreated from his agreement with the C.C.P.A.'s factual findings on restructuring set forth in Prater and Bernhart.

FN52. The Patent Office quotes the Board's opinion dealing with language in the patent claims that the Board questioned on formal grounds under 35 U.S.C. § 112, and uses those quotes to argue "new use," on which the Board had reversed the Examiner.

FN53. Gottschalk v. Benson, 409 U.S. 63.

***26** III. SOFTWARE IS NOT AN "ABSTRACT IDEA."

A. The engineering of software.

The software products segment of the computer industry is composed of hundreds of small and medium size companies, many of which are members of ADAPSO/SIA. On the staff of these companies are thousands of personnel actively engaged in programming. These programmers have I.Q.'s "well above the average college graduate." [FN54] Many have degrees in computer sciences, not infrequently at the masters and doctorate level. Many work with the precision of engineers in a field increasingly known as software engineering. They build software out of building blocks [FN55] to engineer the special-purpose computer in a hierarchical structure, [FN56] much the same as that required for other modern complex machines.

FN54. Psychology of Programming, G. Weinberg, Van Nostrand Press, p. 161.

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FN55. The building blocks of software and hardware are discussed in Jacobs, supra.

FN56. See "Hierarchies--Software Engineering Design," Software Engineering, International Computer State of the Art Report, 1972. p. 47 et seq.

The automobile, for example, is a hierarchical machine system. The designer of the gearbox combines gears and other mechanical parts in a particular way without having to be concerned with or having any knowledge of the molecular structure of the steel used in the gears (which concern is left to a metallurgist). The designer of the overall transmission system simply configures gears, drive shaft, universal, and other elements without concern for the lower hierarchical levels of the specific internal structure of those individual components or of the structure of the steel.

In the hierarchy of computer systems, the logic circuit designer builds logic circuits such as "AND" and "OR" circuits without concern for the molecular structure of the individual transistors and other components that make up ***27** those electronic circuits (which concern is left to component designers working at a lower level of hierarchy). The designer of the hardware function circuits such as "ADD," "COMPARE" and "STORE," configures logic circuits without concern for the detailed structure of the individual logic circuits he uses to construct the hardware function circuits. Similarly, the "programmer," the designer of the special-purpose computer, configures hardware function circuits into the structure of the ultimate special-purpose machine without concern for the detailed structure of the individual hardware function circuits. The same hierarchical process is followed if, instead of softwire programming, hardwire programming is used to build the special-purpose computer.

These building blocks lie on successive levels of a hierarchy [FN57] of circuit construction and the software engineering is performed at the highest level. The software itself, because of its complexity, often must also be constructed in a number of hierarchical levels, and the software engineer should preferably work like:

FN57. See Jacobs, supra, for a discussion of the circuit interrelationships in the different hierarchical levels of a programmed computer.

"... the electrical engineer designing a new T.V. set [who] certainly doesn't design each vacuum tube, transistor, and capacitor all over again; he relies on existing components. In fact, he normally designs on a much higher level, using 'off-the-shelf' power supplies, oscillators, etc." [FN58]

FN58. The IBM report, "Composite Design. The Design of Modular Programs," Jan. 1973, p. 6.

A recent IBM report further demonstrates the similarities in software and hardware engineering:

Structured programming reduces the arrangement of the program logic to a process like that found in [hardware] engineering where logic circuits are constructed from a basic set of figures. As such, it ***28** represents a standard based on a solid theoretical foundation. [FN59]

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FN59. "Management Concepts for Top-Down Structured Programming," IBM Report, February 1973, p. 1.

Working at different levels in the system hierarchy of the special-purpose computer to be built, contemporary software engineers as that IBM report explains, may use a "structured programming" [FN60] approach similar to the design of other automatic machines:

FN60. Ibid., Abstract.

The top-down approach is patterned after the natural approach to system design and requires that programming proceed from developing the control architecture (interface) statements and initial data definitions downward to developing and integrating the functional units. Top-down programming is an ordering of system development which allows for continual integration of the system parts as they are developed and provides for interfaces prior to the parts being developed. [FN61]

FN61. Ibid., p. 6.

In the Apollo Space Shuttle Software System, a mammoth software development effort:

... program structuring is of major importance; decisions ... determine the total structure of the software both statically and dynamically. Program structuring defines the building blocks, the control mechanisms and the interfaces of the software. It is in this effort that the interrelationship of systems software, applications software and data is entirely mapped out. [FN62]

FN62. "Top-Down, Bottom-Up, Structured Programming & Program Structure," Draper Labs, MIT, Dec., 1972, pp. 28, 31.

The software engineer builds complex automatic machines as the foregoing examples amply demonstrates. Neither the software engineer nor the hardware engineer ***29** devises "abstract ideas," or methods of transacting business," contrary to the Patent Office's suggestions (Br. Pet. 21), nor a "mathematical formula, a method of doing business, or an expression of a scientific principle or law of nature," as CBEMA would have the Court believe (Br. CBEMA 5). The software engineer is not constructing "new uses of an existing machine" nor anything resembling a "piano roll [in] an old player piano" (Br. Pet. 35).

Relying on the restructuring principle, the Board found that the respondent's program restructures the general purpose computer into a different machine and not a "new use." This issue did not arise in Benson, which dealt with process claims for a "mathematical formula," not with machines. Certainly the Court in Benson did not conclude that this technology was to be excluded from the patent system.

B. The invention process in software.

The design and development process in this technology is quite similar to that of any other technology. First the goal is decided upon, then the prior art is explored for possible solutions and, if not found, the "technological roadblocks" are identified. [FN63] Invention may take place in overcoming these roadblocks.

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FN63. See, e.g., Computers in the 1980's, R. Turn, Columbia Univ. Press, 1974, p. 21.

Parallels to the design and development process of other machines may be seen in the software design process presented in a paper at the World NATO Conference entitled "Software Engineering" [FN64] which took place in Germany in 1969 and was attended by over 50 experts and prominent leaders in the software field. The first seven stages [FN65] of this process from the conception "***30** of the complete hardware-software system" of the special-purpose computer to be built until the "detail design" is worked out, all involve areas for overcoming "technological roadblocks" and solving machine problems. Invention in the ultimate special-purpose computer may result from the working at the various hierarchical levels of this design process. An additional six stages in the above-cited design process involve testing and operation of the overall machine as well as its parts to determine if the "software-hardware package meets all of its design requirements." If not, further work and debugging at various of the first seven stages may result in other opportunity for invention.

FN64. "Software Engineering," Report on a World Conference Sponsored by the NATO Science Committee, Garmisch, Germany, Jan., 1969, p. 13.

FN65. "a. Specification of the complete hardware-software system. b. Definition of the functions to be performed by the program. c. Design and documentation of the master overall program plan. d. Subdivision of the large system program into manageable program blocks. e. At this point, the interfaces between the program blocks must be precisely defined and documented. Since the usual means of passing data between program jobs is via the use of data in the memory of the system, the fundamental program progress data in memory should be formulated and defined for the interfaces between each program block. f. Basic program subroutines defined and documented. g. Detail design, coding and documentation of each program block."

Nothing in this design process is a "routine" task, as the Patent Office misleadingly suggests. [FN66] The design process suggested by the Patent Office (Br. Pet. 16-17) and CBEMA (Br. 5-6) bears no relation to that of the real computer world.

FN66. Unlike the creative process of designing the special purpose computer, the resulting machine is designed so that its mode of operation is "routine." A complex control task is performed by a combination of elementary machine circuits that are operated over and over again in the same exact way.

IV. COPYRIGHTS CANNOT PROTECT MACHINE INVENTIONS; PATENTS, WHICH CAN, ARE NEEDED FOR SOFTWARE.

CBEMA's suggestions that copyright is a viable method of protecting inventions in programmed computers ***31** is contradicted by the constitutional limitation of copyright protection to "writings." Copyrights may only be used to protect particular printed records and descriptions of machines, but not the actual machine structure that they represent. To one whose innovation is a machine structure for a

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special-purpose computer built with software, only patent protection will suffice.

The copyright laws contain no novelty requirement; exclusive rights are predicated minimally on originality. CBEMA favors copyright protection because its members apparently are not interested in protecting the innovation in software (which may exist in 1% of all programs) but are interested in protecting the non-innovative aspects of software (perhaps 99% of all programs), the part of a machine which has never been protectable, neither by patents nor by copyrights. Such use of the copyright laws to protect non-inventive forms of programmed machines would be a circumvention of the constitutional requirement of novelty (inventiveness) for obtaining exclusive rights in a machine structure. Graham v. John Deere Co., 383 U.S. 1,

Proposals have been made for registration systems (either similar to that of copyrights or of other forms) for the registration of computer programs. A registration system in the U.S. would have the same fundamental objections as those for copyright protection, because it would provide protection in the nature of exclusive rights for machine technology without being based on the constitutional requirements of novelty and invention.

The World Intellectual Property Organization, in considering a registration system that might be suitable in European and other countries, indicated that such a registration system should not be in lieu of patent protection for this technology, but in addition thereto. WIPO made it clear in 1974 that "patent protection should not be withheld from inventions for the reason that they involve computer programs," [FN67] and again in 1975 ***32** because they "involve a software element." [FN68] Thus WIPO indicates that it makes no sense to set a basis for patentability solely on the grounds of the mode of construction of the machine--the entire basis of the Patent Office's case.

FN67. WIPO-AGCP/NGO/9, July 5, 1974, p. 8, ¶ 58(b).

FN68. WIPO-AGCP/NGO/II/11, July 14, 1975, p. 3.

Software is a new technology that is today viewed as the most critical and important element of a computer system. As in any new technology, for it to grow and compete, it needs all the protection due it under the law. ADAPSO/SIA asks the Court to treat the software technology equal to the hardware technology--no better--and no worse.

CONCLUSION

For the reasons stated above, it is respectfully urged that the writ of certiorari be dismissed. In the alternative, if this Court reaches the merits of the case, the decision of the Court of Customs and Patent Appeals should be affirmed.

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For opinion see 96 S.Ct. 1393

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents and Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals

Brief for the Respondent

Morton C. Jacobs, Attorney for Respondent, 828 Suburban Station Building, Philadelphia, Pennsylvania 19103.

Of Counsel Ralph A. Jacobs.

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***1** JURISDICTION

To the extent certiorari lies in matters of patent administrative litigation, this Court's jurisdiction rests on 28 U.S.C. § 1256 as limited by 35 U.S.C. § 141, et seq. Petitioner is jurisdictionally barred from reviving Examiner's "new use" rejection which was overruled by the Patent Board of Appeals. See Section I of the Argument.

QUESTIONS PRESENTED

1. Whether in matters of patent administrative litigation, this Court's certiorari jurisdiction under 28 U.S.C. § 1256 is limited by 35 U.S.C. § 141, et seq.

2. Whether Petitioner is jurisdictionally barred from raising the "new use" rejection which was overruled by the Board of Appeals and was neither appealed to nor argued before the Court of Customs and Patent Appeals.

3. Whether in the absence of a specific congressional exclusion, a special-purpose computer machine can be excluded from the general class of machines constituting

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statutory matters under 35 U.S.C. § 101 by reason of its construction with software rather than hardware for its programming element.

4. Whether the Patent Office denial of patents for "softwire" embodiments of special-purpose computers while granting patents to "hardwire" embodiments is a denial of equal protection of the patent laws.

5. Whether an automatic record-keeping machine for all types of small-volume users (e.g., merchants, professionals, farmers) that enables each to use an individualistic record-keeping format and bookkeeping procedure, and that employs, inter alia, a general control for directing the processing operations that are common to most users, which control interacts with and is directed by a master control located in the data files for directing the operations that vary with each user, is an unobvious improvement over the prior art.

***2** STATEMENT

Respondent's invention [FN1] as described in his patent application is a "machine system for automatic record-keeping of bank checks and deposits," and is concerned with automating by means of a special-purpose computer the widely-varied financial record-keeping required by small-volume users.

> FN1. The assignee of the invention is a small company, Rec-Chek, Inc. of Nevada, Iowa, with fewer than ten employees, which has been developing and marketing this invention for several years.

The Machine Problem to be Solved.

The Government and large companies employ electronic computers for processing masses of financial data by performing vast numbers of elementary arithmetic operations. A requisite of efficient use of the large-scale computer facilities is that the accounting procedures and ledger formats of such a large-scale user [FN2] be uniform so that a single special-purpose computer (usually built by programming a general-purpose computer) can handle all of the data processing.

> FN2. An example of a record-keeping system for large-scale users is described in the prior art patent to Dirks (A. 94-106); "A." refers to the printed Appendix: "Pet." refers to the Petition for a Writ of Certiorari; "Br. Pet." to Brief for Petitioner; "R. Br." to Reply Brief for Petitioner; "Br." plus the name of the amicus to the Brief thereof.

In contrast, low-volume users (e.g., merchants, professionals, farmers) have been prevented from obtaining similar benefit of such computers because the wide variations in the ledger formats and bookkeeping and accounting procedures could not be accommodated by prior art special-purpose computers capable of handling only a single record-keeping format and procedure.

Any single special-purpose computer based on the prior art that would attempt to handle the wide variations in format among small-volume users in addition to being ***3** prohibitively expensive would have other serious drawbacks, since it would require a separate program (in effect, a separate special-purpose computer) for each user. Such a prior art special-purpose computer would not be able easily to

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accommodate users' needs to make changes or corrections in their formats or procedures, nor would it be able to add new users without difficulty. [FN3]

FN3. It is important to note that these drawbacks would exist whichever one of two alternative modes of computer construction was used, whether built entirely of computer circuitry or constructed by programming the circuitry of a general-purpose computer.

The Machine Solution

Respondent recognized that what was needed was a single special-purpose machine which could operate with and accommodate and flexibly adapt to all of the variations in ledger formats and bookkeeping methods that exist.

Respondent devised such a single special-purpose computer (A. 7, 68-9, Figs. 1A, B) [FN4]. The input to respondent's machine is in the form of all of the checks (A. 72, Fig. 4) and deposit slips of each user, and the output is a completely individualized and updated summary ledger (A. 83, 72; Figs. 11, 12) for each user. Its circuitry is structured to provide the flexibility to accommodate the wide variety presented by a large number of small-volume users so that efficient and economic computerized record-keeping is achieved.

FN4. The description in the patent application, in accord with 35 U.S.C. § 112, 1st para., is in such "terms as to enable any person skilled in the art to which it pertains ... to make and use the same." The references to the patent application in the Appendix are to relevant portions which set forth more detailed descriptions of the invention.

This result is attained by the unique configuration of controls which is at the heart of respondent's invention, as the Court below found (Pet. 5A):

***4** The control system ... [of the special-purpose computer comprises] a general control which is applicable to the processing operations that are common to most [users] and a master control for the operations that vary on an individual basis with each [user]. The general control, as allegedly reduced to practice, is in the form of a software program and the master control is a series of subfiles, one for each [user], which are in the form of a sequence of records containing suitable control mechanisms and the [user's] financial data.

The master control mechanisms of each user's sub-file-circuits (A. 73, Fig. 5) interact with and cooperate with the slave or general controls (A. 74-82; Figs. 6-9) to direct the computer circuitry to perform each user's record-keeping according to the user's own bookkeeping or accounting procedure and in his own format.

Inputs to the machine are combinations of signals representing the transaction data in checks and deposit slips, as well as other financial data of the user. Additional inputs are combinations of electrical control signals that represent the format of each user's financial ledger. The format control signals are stored together with the data signals and can be handled in the same way and with the same ease as data signals. It is these format signals which include the "master control" and it is the fact that they are stored with and manipulated like data that gives the invention the unique flexibility described above.

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The signals of the slave control, on the other hand, reside permanently in the memory; they remain the same while the machine processes each user's account. The various functional circuits of the computer are structured by the combined action of the slave control signals and the different ledger control signals (master control) for each user. Only one general or slave control program is employed to function interdependently and in common with all of the different ledger format signals and with the computer's ***5** functional circuits. In addition, the slave control includes other general control signals that operate the computer's functional circuits, directing the performance of record-keeping operations such as sorting transactions, sub-totalizing and totalizing.

More specifically, the master file circuits in memory (A. 17-21, 68, 69, 73; Figs. 1A-B, 5C-E) consist of each user's sub-file circuits (A. 73, Figs. 5C-E) whose states can be modified by having control signals and signals for ledger information inserted or removed as though they were data. Each user's sub-file is a set of record circuits, formed as a mix of three parts. One part 164, 167, 170, 171 [FN5] of these record circuits stores the control signals for the format and bookkeeping method of a particular user's ledger. A second part 161, 163, 165, 166, 168, 169 stores other signals representing distinctive ledger information, which signals are used by the machine in composing and printing out the updated ledger in the user's individual format. The third part 168, 169 of these record circuits stores the signals for that user's financial data.

> FN5. Reference numerals are those used in the patent application, reprinted in the previously identified figures and pages of the Appendix.

A user's complete ledger format and bookkeeping method and the financial data associated with each portion of the format are stored as combinations of electrical signals in circuits of the user's sub-file Fig. 5C. Thus, the sub-files contain all of the signals for the format variations from one user to the next. A first user's sub-file contains the control signals of a first master ledger format and the associated data signals, followed by a second user's sub-file containing the signals of a second master ledger format and data, and so on for a third and subsequent sub-files.

A special control program [FN6] Figs. 6-9 structures the computer's functional circuits in accordance with each ***6** user's different format control and identifier signals 164, 167, 170, 171 stored in his sub-file record circuits Figs. 5C-E. The functional circuits are configured in a specified way for processing each user's account in accordance with his ledger format and bookkeeping system. Slave controls (e.g., Figs. 8C-D, 422-490, Figs. 9B, 556- 578) adapt to the individual variations of the master control and identifier signals 164, 167, 170, 171 stored in each sub-file's record circuits, Fig. 5C.

> FN6. A simple bookkeeping algorithm such as in the prior art cannot be used, because each master sub-file contains a different ledger format with its individual mode of bookkeeping. Thus, the control program cannot be a fixed or invariable one which would handle only a single format. Similarly, a program with different fixed sub-programs built in to provide for all of the format variations would not have the flexibility of respondent's adaptive program, and would require the design of a new sub-program for each new user.

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In operation, the slave control directs the computer circuits to locate a particular user's master sub-file and to locate and identify each of the format control (identifier) signals in the user's sub-file. From the identification of the format control signals the circuits determine the type of record-keeping operations that are required for that user's ledger format. Upon identifying a particular type of operation (i.e., whether a sub-total, a total, or a higher level total, and if a print-out is called for, what ledger information is to be printed out) the slave directs the computer circuits to perform the sequence of functions associated with that operation.

Respondent found that a small group of such signal codes, [FN7] can identify all of the different types of machine ***7** operations that are required for processing the almost unlimited variations that exist among users' ledgers. The slave control program construction adapts to all of these variations; that is, a multi-format construction is achieved with but a single adaptive control program and is therefore a single machine. [FN8] In addition, respondent's machine structure permits changes to be made in the controls for modifying the format or procedure for any small user or for additions of new users to the system, as easily as an error in data (e.g., in an amount of a particular transaction) can be corrected.

> FN7. The identification codes, which are fundamental to the interaction between the two different parts of the control circuitry in the computer, are employed in association with other coded signals. The latter are category codes that operate with circuit mechanisms for interfacing the computer circuits on the input side with the user. These category code signals also are used to structure the output record form so that there is a consistent interface with the user at the output end of the machine also. Thereby, the machine is structured with mechanisms that insure that all of the data is handled consistently, under program control, in accordance with the category codes (i.e., dollars for oranges are added to other dollars for oranges and those for apples to others for apples). This construction is limited to handling financial accounts and for processing different ledger formats.
>
> FN8. In contrast, the prior art machine systems referred to by the Patent Office consist of data files which are uniformly structured (which, therefore, could not contain the master format control information) and a single bookkeeping algorithm which repeatedly operates on each account's data in the exact same fashion. That is, the processing algorithm of the prior art has the single ledger format structure built into it. With this prior art arrangement, each user must walk to the same drummer. Thus, neither respondent's adaptive multi-format system nor any multi-format system is disclosed in the prior art. Moreover, if one wanted to extend the prior art system to handle different ledger formats, a different bookkeeping algorithm would have to be structured for each particular format. Therefore, the prior art would require a separate general control program for each format, and as a result, a multiplicity of individually constructed machines rather than a single machine as here.

The patent claims approved by the Court of Customs and Patent Appeals' decision below are directed to respondent's machine construction employing the aforementioned two-part control mechanism. All the claims specify the different locations of the

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two controls: (a) the master controls are in the data files so that they can be easily changed (e.g., if a user's bookkeeping format changes or to add a user easily), and (b) the general slave controls permanently stored in memory that remain unchanged for ***8** all users, including the mechanisms ("means for identifying ...") for assuring the proper co-action between the two sets of controls. The claims per se do not raise any issue of computer programs; they do not call for the use of a computer program in the construction of respondent's special-purpose computer, and they apply also to the wired computer-circuitry-version. [FN9]

> FN9. Respondent's (A. 66-7) special-purpose computer is also disclosed for construction entirely by equivalent wired computer circuitry known to those skilled in the art, which version is a more costly one given the present state of the computer art and therefore not preferred.

Only machine claims were in the patent application as originally filed. These machine claims were rejected by the Examiner as improper in form under 35 U.S.C. § 112 by reason of respondent's preferred construction with a general-purpose computer and a stored computer program, which the Examiner held was a "use for a known machine." (A. 88). Process claims were required by the Examiner instead. The Board of Appeals reversed this "use of a known machine" rejection, since it was clearly predicated on a lack of understanding of the technological facts of computers and computer programs. As the Board held (Pet. 28A):

... an unprogrammed, or a differently programmed, general purpose computer is [not] the same machine as the one that would result from appellant's programming of the same or of a similar computer.

Simply put, a new program inserted in a general-purpose computer creates a new machine that incorporates, as one part, the machine of the general-purpose computer and, as another part, the computer program, which structures the circuits of the general-purpose computer into a certain configuration. In short, "the program restructures the computer," Flores, (1969) "Computer Software," infra.

***9** After the "new use" issue was overruled by the Board, it did not arise again until petitioner sought to revive it in the Petition for a Writ of Certiorari before this Court. "New use" was not appealed to the C.C.P.A., and was not argued to nor considered in any way by that court. No evidence has ever been presented in the record about the computer technology to support the legal rejection of "new use." The record is barren of any explanation or rationale for the legal conclusion of "new use," [FN10] except for what may be inferred from the above-quoted factual justification given by the Board for its refutation and overruling of the "new use" rejection.

> FN10. Even the Board was unsure of the rationale and noted what "appeared to be" the "bases for these rejections."

The Examiner also rejected the claims as being "anticipated" by the prior art, i.e., as not being directed to a "new machine" or a new process. This rejection was likewise reversed by the Board of Appeals. The Board entered its own "new rejection" of the claims: One rejection was under 35 U.S.C. § 101 on the ground that the claims "would, in effect, grant a monopoly to [respondent] on a method of conducting the banking business since banks would thereby be restricted to the use of their data

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processing equipment only for their own bookkeeping and not being allowed to freely expand into the business of keeping books for their customers." (Pet. 33A-34A.) The Board also said of the claims (Pet. 27A) that they "are either to a method of bookkeeping ... or to apparatus that automatically carries out ... the steps of the bookkeeping method." The Board also entered a rejection under 35 U.S.C. § 103 of the claims as obvious in view of the Dirks patent cited by the Examiner and also in view of a modified bank statement system suggested by the Board. The Board also entered two rejections under 35 U.S.C. § 112 dealing with formal matters; these rejections have not been pursued here, though the petitioner quotes comments of the Board concerning these § 112 rejections.

***10** Thereafter, on appeal to the Court of Customs and Patent Appeals, respondent pursued only the original machine claims. Since the Board had reversed the Examiner on "use of a known machine" and confirmed respondent's right to define his invention as a "new machine," the process claims which had been filed at the instance of the Examiner were not pursued in the C.C.P.A. appeal. Respondent did not believe process claims defined the invention as appropriately as machine claims since the invention has as its nub the control mechanism formed as a combination of two specific parts and the specific location and interrelation of those parts. This control mechanism, respondent has always asserted, is part of a machine rather than a process.

The court below reversed all of the Board's rejections. As to the § 101 rejection on "a method of doing business," the court held that the "appealed apparatus claims are not shown to cover either a method of doing business or even a method of bookkeeping." The Board's assertion that such a monopoly would ensue, the court said, was "misplaced." (Pet. 14A) "Obviously, banks would be free to ... expand their services and use any apparatus that they may desire except the apparatus set forth in [respondent's] claims."

The court below held that the claimed "[r]ecord-keeping machine systems are clearly within the 'technological arts.' Such machine systems, which comprise programmed digital computers, are statutory subject matter," citing In re Bernhart, 417 F.2d 1395. The court also noted that the phrase "technological arts, ... is synonymous with the phrase 'useful arts' as it appears in Article I, Section 8 of the Constitution." (Pet. 13A).

The C.C.P.A. also considered this Court's decision in Benson, which was handed down while that appeal was pending. The C.C.P.A. reverted to its decision in the earlier case of In re Christensen, 478 F.2d 1392 for its analysis of Benson. That case expressed the view of the C.C.P.A. that the issue considered by the Supreme Court in Benson was "a narrow one, namely, is a formula for ... a series of ***11** mathematical calculations a patentable process." Accordingly, the court below did not find the holding of Benson to be applicable to respondent's machine claims, which "do not claim or encompass a law of nature, a mathematical formula, or an algorithm." (Pet. 14A).

The court below dealt with the two obviousness rejections. As to the modification of the prior art proposed by the Board, the court held that modification as far as it goes "may possibly be obvious," but "further modification ... in order to achieve the results of [respondent's] claimed apparatus, would not have been obvious to one of ordinary skill in the art who did not have appellant's specification before him."

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Pet. 15A. In short, the Board's proposed modification did not deal with a multi-format record-keeping machine and certainly not with an adaptive multi-format system produced by the co-acting "master control" and "general control." (Pet. 5A)

As to the rejection on the prior Dirks patent, the court below dismissed it out of hand: "The four brief portions of the Dirks specification referred to by the board and the additional passages of that specification" raised by the solicitor out of "509 pages" of Dirks in the record "simply are not suggestive of the subject matter of the appealed claims." (Pet. 14A) [FN11]

FN11. Judge Markey dissented on the grounds of obviousness.

The court below rejected the Board's arguments on formal and related grounds and pointed out what should have been palpable: The automatic operation was achieved with "not a human being inside or outside [respondent's] apparatus," and that "the identifying operations" of the interacting general controls and master controls "are neither actually performed by a human being, nor can we imagine how they could be realistically performed by a human being. See In re Bernhart, supra." (Pet. 13A)

Judge Rich, in his dissenting opinion below (as in a separate opinion in the earlier case of In re Christensen, supra) made it clear that he did not understand this Court's ***12** reasoning in Benson and did not agree with its decision. He reaffirmed his belief in "the validity of this principle [that] a new program makes an old general purpose digital computer into a new and different machine." (Pet. 19A) Judge Rich found it significant to contemplate

> ... the identities of the troops lined up for battle in Benson ... against patenting programs for software, [namely] the collective forces of major hardware ... manufacturers and their representative associations who, for economic reasons, did not want patents granted on programs for their machines.

Judge Rich explained in a recent article that in his opinion in this case he did "not abandon my personal beliefs about" the patentability of the programmed computer technology. [FN12]

FN12. Giles Sutherland Rich, "Change," 2 APLA Quarterly Journal, 214, 226 (1974).

SUMMARY OF ARGUMENT

Respondent has invented an automatic financial record-keeping machine with a unique structure that makes it possible for small-volume users (e.g., merchants, professionals, farmers) to avail themselves of the data-processing facilities of a large-scale electronic computer. Respondent's machine processes the financial records of each user and produces a periodically updated ledger statement in the user's own bookkeeping format. The unique structure of respondent's invention consists of its having two different controls in different locations: a general control for all the machine operations common to most users, and a master control which resides in each user's data files and directs the general control to operate with all of the individual variations in the user's ledger format ***13** and bookkeeping method. With that control structure, the machine adapts to each user's individual ledger format to process his financial records. None of the prior art cited by the Patent Office is concerned with the problem of constructing a machine

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to process records of small-volume users having a wide variety of ledger formats, nor with respondent's solution using the two different controls in that machine.

The basis for the Board's and C.C.P.A.'s findings below that respondent has invented a new machine different from an unprogrammed general-purpose computer is seen by consideration of the technological facts of programmed computers. A special-purpose computer is a hierarchical machine system built of basic electronic components which are combined to form logic circuits, which are, in turn, combined to form functional circuits. These functional circuits form a "storehouse of parts" that are themselves configured and sequenced by a program into a special-purpose computer, which is a more complex circuit configuration. The elements at each level serve as building blocks for the next level. In a fixed-wire computer, the logic and function circuits are "hardwired" in a permanent form into the desired configuration. However, in a general-purpose computer having a set of elementary function circuits, a "softwired" program, stored in the form of electronic states of the circuits, structures the function circuits into the desired configuration. Programming a general-purpose computer is like wiring a radio from individual transistors, resistors and other components. If the configuration is novel and unobvious, what has been built is a new machine, be it a radio or a special-purpose computer. It is for the resultant special-purpose machine structure constructed by either hardwire or softwire that respondent seeks patent protection.

Because the capability of a special-purpose computer is the same whether hardwired or softwired, these two forms of construction are engineering equivalents. One could build the same machine structure in hardware or ***14** software, and the decision as to which mode of embodiment to employ depends on economic and technological trade-offs. With respect to the patent statutes, both forms of construction must be treated identically.

Petitioner's opposition to a patent for respondent's invention is based on its preferred mode of construction, namely, with a general-purpose computer and a stored program. The legal theory that it is "a new use for an existing machine," is not supported by any evidence and is but a superficial and inaccurate description of this complex technology. The general-purpose computer is an incomplete or unstructured machine serving as a "storehouse of parts" that is structured by the program. The special-purpose computer is not a "use" of the general-purpose computer but a "different machine," as both tribunals below have held; and the special-purpose computer is properly claimed as a new combination of circuits and electrical means under 35 U.S.C. § 112.

The patent claims define a machine and not "a method of doing business" nor an "idea." Anyone would be free to perform similar data processing services for users by means of any other available machine except respondent's machine. The patent claims define a tangible structure and not an intangible process or "idea," nor is any method of bookkeeping or mathematics involved. None of the objections raised by the Court in Benson, supra, apply here.

The Commissioner's "new use" rejection in this case seeks to rebut the factual finding by the Board that respondent's invention is not the same machine as the general-purpose computer. That "new use" rejection was overruled by the Board of Appeals, which also affirmed the principle that programming a general-purpose

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computer restructures the computer so that it is a different machine. The Board also overruled the Examiner on his rejection that the claimed machine was not a new machine. The Commissioner of Patents, who is a member of the Board of Appeals, is bound by both its legal rulings and factual findings. The Commissioner could not and did not appeal to ***15** the C.C.P.A. the Board of Appeals' ruling that the invention was not a "new use," and its "different machine" and "new machine" findings all of which were favorable to the respondent, and the Commissioner is jurisdictionally barred from raising those issues in this Court. 28 U.S.C. § 1256, giving this Court jurisdiction over cases in the C.C.P.A., must be read in light of 35 U.S.C. § 141, et seq. which limits the C.C.P.A.'s jurisdiction over appeals from the Board of Appeals to the review of only those issues decided adversely to the applicant. The C.C.P.A. thereby was without jurisdiction to review the "new-use" ruling and "different machine" and "new machine" findings which were favorable to the respondent. The Patent Office conceded that none of these issues were before the C.C.P.A. by its failure to argue them. Alternatively, if these issues were jurisdictionally before the C.C.P.A., the Patent Office's failure to raise them at that lower judicial level bars it from raising them here. Thus, the clear import of the statute and sound judicial principles dictate that the Commissioner is barred from raising these issues before this Court.

The equal protection guarantee mandates that the treatment of inventors of softwired special-purpose computers be equal to that accorded inventors of hardwired special-purpose computers or any other machine. Petitioner's classification of software inventions as unpatentable is so arbitrary and capricious as to be unconstitutional. All the evidence indicates and both tribunals below have found that software-built special-purpose computers are machines.

To single out the inventors of one class of machine for denial of patent protection is unconstitutional unless supported by some justification that is rationally related to the purposes of this statute. In this case there is no justification, nor could there be because hardware and software are equivalent forms of construction and hardwired special-purpose computers are conceded by all parties to be patentable. In addition, no rationale has ever been suggested ***16** for denying patentability to one class of machines solely due to their mode of construction. Great injury has been caused respondent and the nation's interest in innovative software technology by reason of this irrational denial of the incentives of the patent system.

ARGUMENT

I. Petitioner is Jurisdictionally Barred from Contesting In this Appeal the Rulings of His Own Board of Appeals that Respondent's Invention Is Not a Use of an Old Machine but Is in Fact a Different and New Machine.

The heart of the petitioner's case is his characterization of respondent's invention as something other than a machine, namely, "new use of an existing machine." [FN13] The Board of Appeals overruled the Examiner's "same machine" premise [FN14], upon which his § 112 "use" rejection ***17** was based, as being contradicted by the facts of computer technology, and found that the invention is a machine structure because respondent's programming of a general-purpose computer restructures the latter into a different machine. [FN15] The petitioner, a member of the Board of Appeals, 35 U.S.C. § 7, is bound by that ruling against the Examiner's

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"use" and "not a new machine" rejections and may not contest it in this Court.

FN13. See Br. Pet. 25-37. At various times, the Government asserts the invention is a "new use" 35 U.S.C. § 100(b) (id. 30), an abstract idea or a business method (id. 20-24). Regardless of the various mischaracterizations, once it is apparent the claimed invention is in fact a machine, the patent statute classifies it as patentable subject matter (35 U.S.C. § 101). In addition to the explicit command of the statute, the Equal Protection guarantee mandates the same result; see Section III, infra.

FN14. Pet. 28A. The Examiner made, inter alia, a specific rejection on the ground that "the claims are considered [by him] to be directed to a use for a known machine." Appendix, 88. The Patent Board of Appeals refused to sustain any of the Examiner's rejections finding them all to be interrelated and based upon the Examiner's invalid premise that a programmed computer is the same machine as an unprogrammed computer. Since the Examiner's § 112 rejection of "use for a known machine" was not sustained by the Board it was never appealed to the C.C.P.A. and so is not in issue in this case as the Government concedes in its Brief, at 5, n. 5. The Government seeks to circumvent this fatal jurisdictional defect by extracting the "rationale" of the Examiner's ruling (Pet. Br. 33, n. 24) from the ruling itself and arguing that it has life here and may be considered by this Court. The Examiner's erroneous "same machine" premise, which was rejected by both the Board and the C.C.P.A., is what led him to his equally erroneous conclusion that the claims were directed to "a use for a known machine."

FN15. Stating its agreement with the longstanding finding of the C.C.P.A. that programming such as respondent's does in fact restructure the computer into a different special-purpose machine, see, e.g., Prater and Bernhart, infra, the Board reversed the Examiner's rejection as being based on an invalid view of the technology that was used by respondent to build his machine. (Pet. 28A).

In Brenner v. Manson, 383 U.S. 519, 523, n. 6, the Court noted that since the Board was the Commissioner's alter ego, [FN16] he was "appropriately bound by Board determinations." Similarly, the Court in Glidden Co. v. Zdanok, 370 U.S. 530, 580 (1962) recognized that:

FN16. In fact, the Board is the supreme authority of the Patent Office as to matters that lie within its jurisdiction since the Commissioner may be outvoted by the other members of the Board if he exercises his ex-officio power to sit as a member of the Board. Furthermore, it is the Commissioner who is bound by Board determination and not vice-versa.

Like naturalization proceedings in a District Court, appeals from Patent Office decisions under 35 U.S.C. § 144 are relatively summary--since the record is limited to the evidence allowed by that office--and are not themselves subject to direct review by appeal as of right. It was reasonable for Congress, therefore, to bind only the Patent Office on appeals, and to give private parties whether or not participants in such appeals a further opportunity to contest the ***18** matter on plenary records developed in litigation elsewhere. This practice but furnishes a further illustration of the specialized jurisdiction of the Court of Customs and

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Patent Appeals, akin to that of the Commerce Court, in passing upon the consistency with law of expert administrative judgments without undertaking to conclude private parties in nonadministrative litigation.

This Court's certiorari jurisdiction over administrative litigation cases from the C.C.P.A. under 28 U.S.C. § 1256 must be read in light of the clear intent of the Patent Code to insulate the Board of Appeals' findings favorable to the applicant from any judicial review. As Glidden points out, private parties have "a further opportunity to contest the matter on plenary records developed in litigation elsewhere." The fact that the Commissioner may petition for certiorari review of a C.C.P.A. decision, as Brenner held, does not in any way free him from being bound by rulings of the Board. To hold otherwise would be to permit the Commissioner to appeal from his own Patent Office rulings.

The patent statutes provide that only the applicant may appeal from an adverse decision by the Board, 35 U.S.C. § 141, et seq. Accordingly, the Commissioner of Patents could not (and did not) raise the "new use," "not a different machine" and "not a new machine" issues in the C.C.P.A. and nowhere in that court's opinion are these matters touched upon. [FN17] The Commissioner is likewise barred from raising the "new use" issue here. This Court's ***19** certiorari jurisdiction over cases in the C.C.P.A., 28 U.S.C. § 1256, does not encompass what could not have been (and was not) before the C.C.P.A. [FN18]

FN17. The C.C.P.A.'s jurisdictional statute 35 U.S.C. § 144 states that "the decision shall be confined to the points set forth in the reasons of appeal." None of those points dealt with "new use," nor could they, for respondent was not "dissatisfied with the decision of the Board" (§ 141) in that respect and did not challenge that favorable aspect of the Board's decision. None of the challanged aspects had anything to do with "new use" or "the rationale of the examiner." The reasons of appeal dealt with the Board's rejections, not with its overruling of the examiner. None of the Board's rejections were in any way grounded on "new use." The Board's rejections did not raise the statutory section § 100(b) dealing with "new use," nor did that section arise before the C.C.P.A.
The intervening Benson decision led to a full consideration of Benson before the C.C.P.A. But Benson did not discuss "new use," nor hold that a programmed computer was merely a "new use of an existing machine."

FN18. The situation is similar to that which arises when one party fails to cross-appeal from a lower court's resolution of a particular issue in a case. Without a cross-appeal this Court is bound to accept the unappealed findings of the tribunal below in deciding the other issues in the case. See e.g., N.L.R.B. v. International Van Lines, 409 U.S. 48, 52, n. 4 (unappealed finding that a strike was lawful is binding on the Court in determining whether employees have the right to be rehired). In this case, it is the statutory scheme rather than a failure to appeal which binds the Commissioner.

The petitioner argues that when the C.C.P.A. reverses the Board on an issue, this Court should be able to review the C.C.P.A.'s reversal in light of the Examiner's rationale [FN19] as well as that of the Board (Br. Pet. 33, n. 24). That argument is irrelevant to this case because the C.C.P.A. did not reverse the Board on the "new

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use" issue; it did not have the issue before it and, indeed, was jurisdictionally barred from considering it. [FN20] Once the Board reversed the examiner and found that the programming of a general-purpose computer to implement respondent's invention ***20** was not a "new use" of the computer but a different machine, the issue is not subject to further direct judicial review. [FN21]

FN19. Apparently not content with challenging the Board's hitherto uncontested right to bind the Commissioner by its determination, the Commissioner seeks further to emasculate the Board by proposing that the Board's determinations do not even bind an Examiner. Indeed, the Commissioner would go so far as to exalt the "rationale" of an Examiner to a status above that of the decision-making power of the Board in a vain effort to establish a jurisdictional basis for the "new use" issue.

FN20. The jurisdictional barrier described in Brenner and Glidden is also recognized by the C.C.P.A. which notes that its jurisdiction "extends to and embraces none other than the adverse decision from which appellant has [[taken an] appeal." In re Melott, 331 F.2d 887.

FN21. Realizing that he is bound by Board determinations, the Commissioner attempts to portray his Board as not having ruled against "new use." This position betrays a key weakness in the Commissioner's argument. Assuming the Board did not conclusively decide in respondent's favor on "new use," the Commissioner could have pursued it before the C.C.P.A. Not having done so, the Commissioner has at the least waived his right to raise it here. However, to the contrary, the Board unequivocally overruled the Examiner on "new use" and every other rejection (Pet. 28A).

Were petitioner permitted to bring up for review an issue that was not within the appellate conduit--the specific issues that are appealable and actually appealed to a higher tribunal--the entire patent appeal process would be impaired.

This patent application was originally filed with only machine claims including claims 20-24 which were found patentable by the C.C.P.A. The Examiner rejected (A. 88) those claims on "new use/old machine," holding that claims for a programmed general-purpose computer should be in process form only. Respondent opposed that rejection but added process claims in addition to the machine claims in order to satisfy the Examiner. However, the Examiner thereupon proceeded to reject all the claims by maintaining, inter alia, his "new use" rejection as to the machine claims and rejecting as "not new" [FN22] the process claims which he had solicited.

FN22. Apparently of the view that since the process would be performed by a general-purpose computer, it was not new. The tandem rejections of "new use" and "not new" are discussed below; see n. 37.

The Board of Appeals reversed all of the Examiner's rejections, and particularly that of "new use," on the ground that they were premised upon the Examiner's mistaken notion that an unprogrammed general-purpose computer" is the same machine" as respondent's programmed general-purpose computer, Pet. 28A. The Board then substituted its own "method of doing business" rejection on ***21** unstatutory subject matter, which rejection, in turn, was reversed by the C.C.P.A. [FN23] Only this

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specific Board rejection, together with that of obviousness, [FN24] which were before the C.C.P.A. for decision, are properly raised by the Commissioner before this Court.

FN23. The C.C.P.A. reversal of the Board's method of doing business rejection did not reinstate the so-called "new use" rejection by the Examiner. As noted infra, the C.C.P.A. has consistently rejected any attempt to equate programmed computers with "ideas." Even the Examiner's "new-use" rejection was not applied to the question of statutory subject matter, but solely to his § 112 rejection relating to the formal and amendable question of "failing to point out and distinctly claim."

FN24. The Board rejections on formal grounds, 35 U.S.C. § 112, have not been pursued here by the Patent Office.

Once the "new use" rejection was reversed by the Board, that issue was eliminated from the appellate conduit. Congress has given the applicant the exclusive right to appeal and legislated that all matters resolved in the applicant's favor at the Board level are conclusive against the Patent Office. Respondent, after his success before the Board, on the "new use" issue did not pursue the process claims before the C.C.P.A., and limited the appeal issues to the machine claims 20-24. In so doing, respondent relied on the fact that the Board of Appeals had made a final determination of the Patent Office position on the "new-use" issue as it applied to this case by rejecting it and replacing it with the technologically sound "different machine" finding. The judicial process requires the confidence of all litigants that matters finally resolved in a proceeding remain so.

This finality is important to an applicant receiving an adverse Board decision in making a choice between alternative appeal routes. Had the Board ruled in favor of the examiner on "new use" (i.e., rejected the facts of computer restructuring) respondent could have availed himself of the District Court route, 35 U.S.C. § 145 and built a fact record to rebut such an unfavorable Board determination. But the Board having agreed with the ***22** technologically sound restructuring principle in overruling "new use" there were no factual issues requiring the establishment of a District Court record in support of respondent's position. That is why the respondent appealed to the C.C.P.A., where the appeal is determined "on the evidence produced before the Patent Office." 35 U.S.C. § 144. This underscores the appropriateness and soundness of the appellate scheme of barring the Commissioner from raising (here as well as before the C.C.P.A.) legal (as well as factual) questions that were resolved favorably to respondent at the Board of Appeals. [FN25]

FN25. On the other hand, there is no factual record here in support of petitioner's theory of "new use." The factual record in the present case, which consists only of respondent's patent application and the prior art cited by the Patent Office, is manifestly inadequate to support petitioner's position in the face of the findings by both tribunals below and the overwhelming technological evidence against it. The factual record developed by the Patent Office does not attempt to deal with the broad question of computer program patentability, and this Court would venture into deep water if it attempted to reverse the findings of the Patent Board of Appeals and the C.C.P.A. without a fully developed record, including the testimony of experts

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who had been subjected to cross-examination and a documentary history of the development of computer programming to date. (See Brief amicus of Los Angeles and Philadelphia Patent Law Associations, p. 8).

II. Respondent's Invention Is Patentable as a Machine.

A. Respondent's Invention Is A "New Machine."

The entire issue of patentable subject matter in this case is whether respondent has invented a "machine" [FN26] under 35 U.S.C. § 101. Heretofore, any apparatus which operated automatically (that is, without human intervention) ***23** was clearly conceded to be a machine. [FN27] Respondent's invention is a machine on its face, for it achieves a unique end result without "a human being inside or outside [the] apparatus" (C.C.P.A. below, Pet. 13A).

FN26. As the Court said in Burr v. Duryee, 68 U.S. 531, 570: "A machine is a concrete thing; consisting of parts, or of certain devices and combination of devices. The principle of a machine is properly defined to be ... that peculiar combination of devices which distinguishes it from other machines." Robinson on Patents, Vol. I, p. 257, § 173, defines a machine as "an instrument composed of one or more of the mechanical powers, and capable, when set in motion, of producing, by its own operation, certain predetermined physical effects. It is an artificial rule of action, receiving crude mechanical force from the motive power, and ... transforming ... it according to the mode established by that rule."
A renowned computer scientist and Professor of Electrical Engineering at the Massachusetts Institute of Technology has given this definition: "When we talk about a machine we have in mind not only (1) an object of some sort, but (2) an idea of what that object is supposed to do.... One expects a machine to have a significant number of 'parts' and to perform some reasonably complex operation on something, but it is difficult to capture in the same definition machines which peel apples and machines which transform coded information signals!" Minsky, M. L., Computation: Finite and Infinite Machines, 1967, p. 3. This treatise presents a theoretical analysis of a programmed computer as a machine that is structured by the program; see, e.g., at pp. 200-1.

FN27. Congress has never exluded any technology from the statutory classes nor from the class of machines with but one exception, the exclusion on atomic weapons 42 U.S.C. § 2181a, and never on the mode of construction of a machine, which is the essence of the ruling requested herein by the Patent Office in violation of the clear proscription of 35 U.S.C. § 103 that "Patentability shall not be negatived by the manner in which the invention was made."

Respondent's special-purpose computer automatically keeps records in different individual formats for a variety of different users. The claims define respondent's invention as a "combination of devices" (Burr, supra): See 35 U.S.C. § 112, 3rd. para.

Petitioner denies the patentability of respondent's invention: a special-purpose computer which is preferably constructed with a stored program and a general-purpose computer. He concedes the physical changes produced by the stored program:

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***24** "the state or configuration of its circuitry [is] readily changed without rewiring or other visible physical changes, [which] changes are accomplished by the use of different 'programs"' (Br. Pet. 15).
But he nevertheless denies that the invention when so constructed can be claimed as a "machine" under 35 U.S.C. § 101.

The Patent Office argues that respondent's invention is "a new use for an existing machine" (Br. Pet. 25) even though the patent claims define a machine structure quite different from that of the general-purpose computer and from any other "existing machine." [FN28] The Patent Office's argument is that the general-purpose computer is "existing," and a program is merely a "new use" of that general-purpose computer and, therefore, the invention must be defined as a process. This procrustean argument is but the first step in the Patent Office position which requires that all programmed computers must be cut or stretched into a uniform framework of "process." The remainder of the argument is the contention that all programs claimed as a process have been held by Benson to be abstract ideas and, therefore, unpatentable subject matter, even though the Court categorically stated: "We do not so hold." (Benson, supra, at 71.)

> FN28. The statutory language of 35 U.S.C. § 100(b) is that "a new use of a known ... machine" (emphasis added) is a process. As is explained hereinafter, and as the Board of Appeals held below, the programmed computer does not fall within the statutory "new use of a known machine" concept. The Patent Office Brief does not explain what, if any, significance is to be attached to its use of the word "existing" instead of the word "known."

Unlike the Benson claims, the claims that were found patentable by the court below, are directed to a record-keeping machine for financial accounts, and not to a process, nor to an idea, nor to a mathematical formula or algorithm. Moreover, the claims are directed to tangible machinery having a particular configuration of master and ***25** slave control mechanisms whose interrelationships are specifically defined, and also having a processor, a memory, and input and output devices. The claims thus are limited to a particular art and technology, to a machine composed of a particular construction of apparatus and to a particular end use. The only thing that would be patented by these claims is a particular machine, namely, a "configuration" (Br. Pet. 15) of electrical circuits. The same end use can be achieved with other machine constructions than that of the claims. Thus, these machine claims are totally different from and do not fall under the proscription of the "nutshell" and other criteria used in Benson to pass adversely on the patentability of the mathematical process in that case.

The Court in Benson dealt with the specific "mathematical formula" or "procedure" or "algorithm" before it and did not attempt to pass on the patentability of the entire technology of computer programs. Furthermore, there was no technological record on which such a decision could be grounded. [FN29]

> FN29. Compare the subsequent decision of the German counterpart of Benson, the only known case on patents for computer programs of the German Federal Patent Court, decided May 28, 1973, (4 CLSR 474). That German court, much as this Court in Benson, did not pass on the patentability of computer programs. That court said it "believes it is neither in a position, nor does it see a reason,

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> to take a basic stand concerning the problem of patentability of computer programs [for the] prerequisite does not exist [[of a] definition of the term 'computer program' binding in a patent law consideration."
> The German Court also noted this Court's decision in Benson, but nonetheless held patentable a process claim which had clear machine limitations: "[T]here is no doubt as concerns the fact that the means used to carry out the process claimed are technical, namely, portions of a data processing apparatus. Since employing these means, as defined in detail in the characterizing method steps, is carried out independently, i.e., without the assistance of a human being, no reservations exist also in this regard with respect to the technical nature of the invention. Finally, there is no doubt that the claimed process serves a technical purpose."

The "new-use" argument of the Patent Office is directly contradicted by its own concession of the "possibility of ***26** patentability" of software-embodied inventions [FN29a] and by the facts of the nature of programmed computers. These facts are made clear by (a) the computer experts, (b) the C.C.P.A. findings in other cases, (c) the Patent Office's own findings some years ago, and (d) the Board of Appeals' specific fact finding herein. [FN30] The computer experts explain the facts of the well-known "feature distinguishing the computer from other mechanisms ... its restructurability .... The program restructures the computer. [FN31] The findings of fact as to this computer technology by the C.C.P.A. in a long line of cases up to the present [FN32] have held that a general-purpose computer is a "storehouse of parts":

> FN29a. R. Br. at 2.
>
> FN30. Consistent with the C.C.P.A. decision herein is the most recently decided case before the Royal Courts of Justice, the Patents Appeal Tribunal of Great Britain. In the Matter of THE APPLICATION OF BURROUGHS CORPORATION, 1973, decided on an appeal of Burroughs Corporation, (a member of CBEMA) the Court held that the Applicant's invention "is embodied in the apparatus and programme described which has the effect of permanently controlling the whole system so that it operates in this particular way unless and until the programme is changed ... [I]n our view computer programmes which have the effect of controlling computers to operate in a particular way, where such programmes are embodied in physical form, are proper subject matter for letters patent." [citing Slee & Harris' Applications (1966 Reports of Patent Cases 194) and Gever's Application (1970 Reports of Patent Cases 91)].
>
> FN31. Professor Ivan Flores, City University of New York "Computer Software," Science & Technology, No. 89, May, 1969, pp. 16, 17.
>
> FN32. In re Prater and Wei, 415 F.2d 1393 (1969); In re Bernhart, 417 F.2d 1395 (1969); In re Comstock, 481 F.2d 905 (1973); In re Knowlton, 481 F.2d 1357 (1973).

But once a program has been introduced, the general-purpose digital computer becomes a special-purpose digital computer (i.e., a specific electrical circuit ....) [FN33]

> FN33. In re Prater, supra, n. 29.

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***27** The special-purpose computer "is physically different from the machine without that program" and is patentable as a machine defined as a new combination of elements under 35 U.S.C. § 112. [FN34] The Patent Office in its Guidelines for Examination of Computer Programs (1966), [FN35] written in part by members of the Patent Office Board of Appeals, [FN36] recognized that the stored program converts that "'warehouse' of unrelated parts" of the general-purpose computer into a "special-purpose machine" which may be patented as "a novel and useful machine combination due to the interrelation of parts ... and the fact that portions of the complete machine take the form of a replaceable program is of no moment."

FN34. In re Bernhart, supra, at 1400. Judge Rich in his opinion below reaffirmed "the validity of this principle [namely] a new program makes an old general purpose digital computer into a new and different machine" at the same time that he dissented so as to call for this certiorari, seeking thereby to cause a reexamination of the Benson decision. There has always been unanimity and no dissent in the court below on "the validity of this principle."

FN35. 829 O.G. 441, 442, by Order of Commissioner of Patents Brenner, August 9, 1966.

FN36. See Commissioner of Patents Brenner. "The Future of Computer Programs in the United States Patent Office." Law of Software, 1968. p. B-8.

In this case, the "new use" argument raised by the Patent Examiner to reject the machine claims, was reversed by the Board of Appeals as based on an invalid factual premise. The Board found (Pet. 28A):

... that an unprogrammed, or a differently programmed, general-purpose computer is [not] the same machine as the one that would result from appellant's programming of the same or of a similar computer.

The Board used this same ground for reversing the Examiner's additional rejection under 35 U.S.C. § 102 of the machine claims as "not new." [FN37]

FN37. The "new use" and "not new" rejections were employed in tandem in the Patent Office in the nature of a "catch-22". The "new use" rejection was used by the Examiner to require the "process" claim format. Compliance with that requirement was followed by the "not new" rejection on the grounds that the process steps involved are those of the "existing" general-purpose computer. The Examiner and the petitioner, by treating the invention as a process, give no weight in the claims to the machine limitations to respondent's controls and their interrelationships and different physical locations. The "not new" rejection of the Examiner was made though the Patent Office has never suggested that any of the cited prior art machines operates in the same way, or produces the same end result or is constructed with the same controls.

***28** Thus, the Patent Office seeks to resuscitate herein the "new use" argument contrary to its own factual findings, those of the tribunals below and the computer experts. [FN38] Petitioner offers no supporting technological facts for his position, and relies on the legalisms of the "new use" theory to rebut the facts. The following discussion of the nature of the computer and stored-program technology is presented in order to assist the Court in understanding (a) the factual findings

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of the tribunals below that respondent's preferred embodiment of a programmed computer is a "different machine" and a "new machine" and (b) the legal ***29** conclusion of the Board that the respondent's invention is not a "new use" as petitioner argues. [FN39]

FN38. This revival of the examiner's "new use" rejection, which was not and could not have been appealed to the C.C.P.A., is barred jurisdictionally as explained above in Section I. In addition, this Court has made clear that the concurrent findings by both tribunals below of the facts of a technology will not be reversed or questioned by this Court; in a "technical area [the Court] would not overturn the finding of the ... Board of Appeals ... not challenged by the C.C.P.A." Brenner v. Manson, supra, at 532. Furthermore, there is no factual record to support the Patent Office's argument seeking to justify its legal position. As the Court has stated. "Appeals from Patent Office decisions ... are relatively summary--since the record is limited to the evidence allowed by that office.... It was ... reasonable for Congress, therefore, to bind only the Patent Office on appeals and to give private parties ... a further opportunity to contest the matter on plenary records developed in litigation elsewhere." Glidden v. Zdanok, 370 U.S. 530, 578-9 (1962).

FN39. Petitioner's attempt to have this Court determine by legal fiat and contrary to the facts, the nature of computers and computer programs brings to mind the declaration of the Court of the Special Inquisition that the sun rotated around the earth in the face of Galileo's evidence of a different structural relation of sun and earth; see J. Bronowski, The Ascent of Man, (1973) p. 213, et seq.

1. Respondent's record-keeping machine system is a circuit configuration.

Respondent's special-purpose computer is constructed as a configuration [FN40] of electrical components formed in "a specific electrical circuit." [FN41] This structure of respondent's machine (and of other machines implemented with a general-purpose digital computer and an internally-stored computer program) is illustrated in the accompanying diagram of the hierarchical structure of a special-purpose computer (see p. 30).

FN40. Defined in Br. Pet. 15, n. 13.

FN41. In re Prater, supra., n. 29.

In this diagram, each level of the hierarchy, [FN42] supplies the building blocks out of which the circuits of the next level of the system [FN43] are built. The bottom level consists of electrical components from which the logic circuits of the next level are configured. The logic circuits are combined into the more complex building blocks--circuits called the "functional units" [FN44] of the general-purpose computer's processor. [FN45] These functional units,

FN42. "Hierarchy ... a rank arrangement in which the nature of function at each higher level becomes more broadly embracive than at the lower level." (A. Iberall, Toward a General Science of Viable Systems, McGraw-Hill, 1972, p. 388.

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FN43. "System. A complex unity formed of many, often diverse, parts subject to a common plan or serving a common purpose. ..." (Ibid. at p. 7).

FN44. Professor Ivan Flores, Computer Logic: The Functional Design of Digital Computers. (W. L. Everitt. Editor) Prentice-Hall. Inc., 1960, Chapter Eleven. "Functional Units." pp. 173-207.

FN45. And into the other circuits (e.g., memory, sequencer control, input and output) that form the general-purpose computer. "The term logic ... describes the interrelation among the primary building blocks of the computer." Flores, ibid., p. 123.

***31** in turn, are combined into the special-purpose computer (such as respondent's) which receives input signals (the checks and deposit slips) and produces output signals (the updated ledgers).

The electrical components. e.g., resistors (R), diodes (D), transistors (T), at the bottom level [FN46] of the hierarchy are like those used in all modern electronic equipment (e.g., in radar, television, radio, telephone, automation). These electrical components are combined in different circuit configurations to form logic circuits called AND. OR and NOT which transform electrical signals in a manner representative of their named logic operation. [FN47]

FN46. At a still lower level of this structional hierarchy, the molecular and atomic substructure of these components (such as the solid-state transistors and diodes) are important factors in their design and in their interrelationships at higher hierarchical levels.

FN47. The AND circuit produces an active output signal when all of the circuit's inputs are active; OR, when either one or another, or all of its inputs are active; NOT produces an active output when its input is not active. In place of three different types of logic circuits, many digital computers are built from combinations of a single such circuit, the NOR (the negative of OR; its output is active when neither of its inputs are active).

The logic circuits are structured at the next level into functional circuits (Adder, Compare, Fetch and Store and Branch or Conditional Transfer of Control). These functional circuits combine electrical signals in accordance with their named function. The Adder functions to add numbers represented by combinations of signals. Similarly, the Compare circuit operates to compare numbers for the relations of equality and "greater than" and "less than." Fetch and Store are control circuits for moving data signals to and from the memory, which is constructed from millions of flip-flop circuits, the basic storage units for the binary computer signals. [FN48]

FN48. The flip-flop is also formed from the logic circuits.

The Branch or Conditional Transfer of Control performs a function unique to digital computers, whereby the sequence of functional circuits can be varied in accordance ***32** with different conditions of the input or processed data. In a simple example,

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if a first number is greater than a second, one sequence of functional circuits is activated; but if second number is the greater, a different sequence is activated. [FN49]

FN49. As explained in ADR Brief, amicus curiae, p. 11, et seq. this Branch control (or "Decision") is fundamental to the ability to structure a general-purpose computer into a special-purpose computer by means of software programming.

A general-purpose computer is configured to have a basic "repertoire" of functional circuits (also called "instructions" or "orders"). [FN50] The structural configuration of each of these functional, control and memory circuits is called "permanent programming" [FN51] or "hardware programming." [FN52]

FN50. A more elaborate set (e.g., to perform also subtraction, multiplication and division, shifting of numbers, etc.) is often used.

FN51. I. Flores, (1960), supra, p. 42.

FN52. Prof. Saul Rosen, "Hardware Design Reflecting Software Requirements," 33 Proc. Fall Joint Computer Conference, 1968, Pt. II, pp. 1443, 1444.

Programs in the broader sense are part of all automatic machines, and automated systems. "Program elements determine what the automated system shall do and how the parts of the system must function in order to accomplish the desired result." [FN53]

FN53. "The program may consist of mechanical parts such as gears, cams, and linkages that connect the various portions of a machine together and determine the timing of the various actions of the machine. In the most modern computer-controlled systems, the program may be stored in the form of punched paper cards, paper tape, magnetic tape, ferrite cores, electronic circuits, or other mechanical or electronic "memory" devices. 2 New Encyclopedia Britannica Macropaedia. 505, 506, "Automation."

"Software programming" [FN54] is the structure of the special-purpose computer which configures the functional circuits (Adder, Compare, Branch, etc.) to interconnect certain sequences of those circuits and combinations of ***33** those sequences. [FN55] The software programming (the internally stored program) takes the physical form of combinations of different "states" [FN56] of the memory circuits and of electrical signals that control the states and configurations of the functional circuits.

FN54. Term used herein for what is customarily called "computer programming" to avoid semantic confusion with hardware programming.

FN55. Basic repetitive sequences are called "sub-routines." (Br. Pet. 15).

FN56. (Br. Pet. 15, n. 13).

Software programming resembles hardware programming in a number of respects, and most importantly in the way that lower-level building blocks are structured. [FN57]

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However, the connector used with the software for configuring the functional units is a different type from that of the hardware programming. Starting at the bottom level of the hierarchy the electrical components are connected together in the logic circuits by fixed wire or "hardwire" connectors. [FN58] The logic circuits are similarly hardwire connected into the functional circuits and other circuits of the general-purpose computer. However, at the top of the hierarchy, a "softwire" connector is employed for the software structure. This connector includes a function ("instruction") sequencer, which effectively interconnects the functional circuits in the sequences prescribed by the software programming. [FN59]

FN57. The software and hardware programming are engineering equivalents, as discussed hereinafter.

FN58. "Hardwire" connections may be made by simply twisting or soldering wires together or in more advanced fabrication by printed circuits or integrated circuits; see Scientific American article, May, 1975, "Microprocessors."

FN59. The function sequencer activates by control signals the circuitry of the functional units at the appropriate times in sequences specified by the software programming. When activated the circuits are effectively "connected," and when inactive they are not. The engineer's term "softwire" refers to use of control signals for the connections. The sequencer, memory, input and output circuits are all part of the general-purpose computer; the control program is in the states of the memory circuits.

By forming the structure at the top of the hierarchy as electrical signals, that structure can be stored in the ***34** computer memory in the same way that other signals are stored. The ability to store the structure of a special-purpose computer in the form of electrical signals gives rise to the ability to replace one such structure by another simply by replacing one set of electrical signals (software program) by another. This concept of the stored-program computer is the foundation on which the computer industry is built.

Since the building blocks of each hierarchical level of such computers are nested within those of the next higher level as shown in the diagram, the special-purpose computer at the top level includes all of the elements and structural relations shown in the drawing. This special-purpose computer receives input signals and, within its circuits, combines them and modifies them to produce output signals. The combining and modifying is in accordance with the structure of the stored software programming, which uniquely establishes the "rule of action" of the special-purpose computer.

Respondent's special-purpose computer, in the same way, functions as "a specific electrical circuit" [FN60] configured out of sequences of functional circuits, which in turn are configured combinations of logic circuits, which in turn are configured combinations of circuit components.

FN60. In re Prater, supra.

2. The general-purpose computer is an incomplete machine that serves as "a storehouse of parts" and is completed by respondent's stored program to form a new

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combination as respondent's record-keeping machine.

The general-purpose computer, though extremely complex, is an inchoate, an incomplete machine. The functional circuits (Adder. Compare, Branch, etc.) are not interrelated nor do they co-act in any useful way until structured [FN61] by the software programming into a special-purpose computer. The functional circuits are building ***35** blocks used by the software; and in that respect the general-purpose computer is a " 'warehouse' of unrelated parts." [FN62]

FN61. See Flores, (1969), supra. pp. 16, 17.

FN62. Patent Office Guidelines (1966), supra.

This "storehouse of parts" [FN63] character of the general-purpose computer is evident from the hierarchical diagram supra, p. 30. Starting at the bottom level, each level serves as a storehouse of parts for the next higher level. The electrical components (resistors, diodes, transistors) serve no purpose by themselves and acquire functions only when connected in the various circuit configurations of the logic circuits. Similarly, the logic circuits serve only as a storehouse of parts for assembling the different circuit configurations of the functional units, and the latter circuits which constitute the general-purpose computer are interconnected by the software programming in the various sequences and combinations that make up the special-purpose computer.

FN63. In re Prater, supra.

The set of building blocks at each level is similar to the familiar toy Erector Set, whose parts can be connected in an unlimited number of ways to form machines of a wide variety of types. For example, with a storehouse of the electric components (resistors, diodes and transistors, etc.) almost all of the known electrical circuits can be built. including those of the computer logic circuits. With a storehouse of logic circuits, all of the various functional and other circuits of general-purpose computers can be built. [FN64] Similarly, the function circuits are interconnected by the software into an endless variety of automatic machines--a musical synthesizer, the controls of a lunar landing module, a document reader for electric meter reports, a calculator for thereafter calculating and printing the associated ***36** electric bills. Respondent's record-keeping machine is similarly constructed in its preferred form of construction.

FN64. Special-purpose computers are also built directly from the logic circuits using permanent or hardware programming. One could also use the logic circuits as the functional units of the general-purpose computer, namely, the building blocks for software programming; but "such an approach would be impractically slow." Goldstine, H. H., The Computer From Pascal to von Neumann. (1972), p. 257.

There is no predetermined relationship of the function circuits (Adder, Compare, Branch, etc. or their individual functions) to any of the above special-purpose computers and other devices; they are "unrelated parts" [FN65] (emphasis added). Nor is there a predetermined relationship of the resistors, diodes and transistors to a computer or television set. However, when the functional circuits of the general-

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purpose computer are structured into a "dynamic interrelationship" (Br. Pet. 36) by software programming--such as that of any of the above examples--these circuits are organized and interrelated by that programming just as are the electrical components in a television circuit. In that condition, the function sequencer makes the softwire connections called for by the stored program so that the functional circuits are connected into a special-purpose computer having the structure called for by the program.

FN65. Patent Office Guidelines (1966), supra.

The hardwire programming is used in building the functional circuits from the logic circuits and softwire programming is used in inter connecting the functional circuits into a special-purpose computer; both connect building blocks into more complex structures.

In short, as the Government asserted in another case, a software program may be "a technologically innovative product" [FN66] and may be demonstrated to have "technological superiority". [FN67]

FN66. Government's Pretrial Brief in United States v. IBM. 69 Civ. 200, at p. 202.

FN67. Ibid. at p. 29. This Government Brief in the IBM case makes it clear that the software industry is in the business of selling technological products (machines) not "ideas" or "methods of doing business." See ADAPSO Brief amicus herein, p. 3, et seq., which contrasts the different Government positions in this and the IBM case See ADR Brief amicus herein p. 6, et seq. for a further discussion of the software industry as a business of machine products.

***37** 3. Hardware and software programming are equivalent and alternative approaches for the construction of computer systems and equally patentable.

The Patent Office has set up a false dichotomy in the patentability of computers. Those implemented by hardware programming (e.g., the general-purpose digital computer) are recognized to be machines by petitioner and "patents covering such machines" (Br. Pet. 35) are granted subject to their meeting the statutory tests of novelty (35 U.S.C. § 102) and unobviousness (35 U.S.C. § 103). However, computers implemented by software programming are generally denied patentability. [FN68]

FN68. The Patent Office is not consistent in this respect; many of the Examiners understand the machine structure of software, as shown by the recently issued patent for an "Analytic Character Recognition System" implemented by software, U.S. 3, 873, 972.

Petitioner's distinction between the two alternative forms of computer construction is inconsistent with the well-established technological "principle of the equivalence of [software] programming and hardware. This principle [is based on the fact] that a program for a general-purpose machine turns it into a special-purpose machine." [FN69]

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FN69. "The principle becomes more tangible when we compare in detail the logical design of that special-purpose machine with the flow chart of that program." Prof. Saul Gorn, Final Report No. AD 59 URI, at p. 4, from Univ. of Penna. Moore School of Elec. Eng. to U.S. Army Signal Research & Development Labs, 1959.

Respondent's patent application also sets forth (A. 66-7) this equivalence and notes that the invention can be alternatively implemented in a hardwire embodiment. [FN70]

FN70. Two engineering approaches are available for constructing a complete hardware version of a special-purpose computer. One is to use the structure of the software programming and connect functional units (or more complex modules) by hardwire connections [see article by David M. Robinson, of the University of Delaware. "Digital System Design With Control Modules." Proceedings of the Seventh Annual Institute of Electrical and Electronic Engineers Computer Society, International Conference, February 27-March 1, 1973]. The other is to redesign the system of the special-purpose computer so that hardware programming is used to configure the logic circuits directly into the final hardwired system. Under 35 U.S.C. § 112, the claims herein "shall be construed to cover the corresponding structure ... described in the specification and equivalents thereof."

***38** Petitioner has acknowledged this equivalence of hardware and software means, namely, that a special-purpose computer can be built either by hardwired logic circuitry or by programming a general-purpose computer. [FN71] The particular means that is used (as respondent noted in his application, A. 67) depends upon many business and engineering trade-offs. [FN72]

FN71. "The particular operations to be performed by a computer are governed by the state and configuration of its electronic circuitry [which] can be fully built into the computer through wires.... Alternatively, the computer may be designed so that the state or configuration of its circuitry can readily be changed without rewiring or other visible physical changes ... by the use of different 'programs."' (Br. Pet. 14, 15)

FN72. "Perhaps the most important part of the job of computer system design is to determine which functions are best handled by hardware, and which should be provided by software. All of the traditional engineering considerations come into play here. One must consider the added cost of additional hardware measured against possible gains in operating efficiency. One must consider the availability of manpower with the appropriate skills for design and for implementation. One must also consider intangible factors such as the inherent advantages of simplicity and the hidden costs of complexity.
"From the point of view of the computer user it makes no difference which features are incorporated into the hardware and which are programmed in software.
"It is the combined hardware-software system, the 'extended machine' that the user must rely on to provide the power and flexibility and convenience that have been promised with each new generation of computing equipment." S. Rosen (1968), supra.

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This equivalence is inherent in the concept of the stored-program computer. The first electronic computer, the ENIAC built about 1945, was "not a stored-program ***39** computer. Programs were installed and changed by engineers who changed the wiring among its various components." [FN73] The stored-program concept, invented while the ENIAC was being built, had as its very purpose the replacement of the hardwire connections by the softwire. The first published description [FN74] of the stored-program computer clearly explained (p. 1, ¶ 1.2) that the program ("instructions" [FN75]) was "an integral part of the [[computer's] structure."

FN73. S. Rosen, Purdue University, "Electronic Computers: A Historical Survey," Computing Surveys, Vol. 1 (1969), pp. 7, 8.

FN74. A. W. Burks, H. H. Goldstine, J. von Neumann, Preliminary Discussion of the Logical Design of an Electronic Computing Instrument, 1946. In this famous "paper that became a landmark in the history of computer sciences if not in the history of human thought," (4 New Encyclopedia Britannica: Macropaedia, 1045, 1047) John von Neumann and his colleagues at the Institute for Advanced Study in Princeton first published "this stored-program concept" on which the modern computer is based and the technology of which underlies the issues in this case.

FN75. A human receives instructions on how to operate the manual choke in an automobile. When an automatic choke is built in by means of a "program," we don't think of "instructing" the engine or its controls. Yet that is the terminology of the computer industry established thirty years or more ago to describe the automatic controls of a stored program. The automatic control of the choke in future cars will be done by a more advanced programmed general-purpose computer, and appropriate computer "instructions" will be used for that purpose. See Vacroux, infra, n. 76, at p. 40.

As far back as 1949, when the first stored-program computer was constructed in England, its builders recognized the equivalence of programming by hardwire and softwire, and explained that additional functional circuits could be added to the computer or the equivalent software programming could be used to implement the same functions. [FN76]

FN76. M. V. Wilkes, "Progress in High-Speed Calculating Machine Design," Nature, Vol. 164 (1949) pp. 341-3.

The Patent Office has no difficulty in finding patentable subject matter in the hardwire approach to building ***40** special-purpose computers which technologically began to be replaced 30 years ago with stored-program inventions. However, it insists that the stored program approach which is the present foundation of the computer industry and is revolutionizing the entire electronics industry is not patentable.

The equivalence of hardware and software underlies this revolutionary change taking place today in the electronics industry. Programmed microcomputers (general-purpose computers constructed with "microscopic components" [FN77]) are used to build electronic apparatus in "a wide range of applications from specialized laboratory

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instruments to sales terminals and electronic games." [FN78]

FN77. A. G. Vacroux, "Microcomputers," supra. pp. 32, 33.

FN78. Ibid., p. 34.

"[C]ustom-designed large scale [digital] circuits ... can be justified only when they are produced in volumes large enough (50,000 units, say) to amortize their development costs." Such expensive electronic systems that "cannot be modified or adapted for an application for which they are not designed" [are being replaced by] "versatile devices such as microprocessors incorporating no custom-made features except the contents of a ... programmed ... memory."

"Until recently digital circuits were designed almost exclusively with 'hardwired' logic ... Although this approach is very powerful (indeed, it is used in most of the electronic equipment manufactured today), it yields an inflexible product that is difficult to modify or improve without major redesign. Most of the microcomputers in service today were adopted as a replacement for inflexible circuitry.... it is to their flexibility, inherent in all stored-program systems, that they owe most of their popularity.

* * *

"The automotive industry will probably be the largest single user of microcomputers. They will replace the ***41** custom-designed [hardwire] devices already installed by many manufacturers for monitoring brakes, lights and battery, for seat-belt interlocks and for skid control ... they will take up many new functions such as the control of ignition, the optimization of the fuel-air mixture, the reduction of exhaust emissions and even the continuous indication of fuel consumption in miles per gallon." [FN79] (emphasis added)

FN79. A. G. Vacroux, "Microcomputers," supra, pp. 39, 40.

Thus, the general-purpose computer has become (in miniature size) a tool that is structured by the addition of programs to build all kinds of instruments and apparatus. Each programmed microcomputer is a different electronic machine as is each hardwired device that the programmed microcomputer is replacing. Such electronic machines have unquestionably been patentable subject matter under 35 U.S.C. § 101 when hardware programming was used. The objection to patentability based upon the use of the more modern and "flexible" technology of the stored program cannot be justified by any basis in law or fact. [FN80]

FN80. The failure to recognize the equivalence of hardware and software opens a pandora's box and leads inevitably to a "raiding" situation in which existing hardware patents have no legal protection from infringing software-constructed devices. See Digitronics Corp. v. The New York Racing Association. 67 Civ. 1119. U.S.D.C. (E.D.N.Y.), Memorandum Decision, Sept. 16, 1975. This problem is not limited to the computer field, for many automatic machines have the potential to employ a programmed general-purpose computer to replace their existing electronic, electrical or mechanical controls. See 2 New Encyclopedia Britannica. "Automation." supra.

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The denial of patents to a modern technology (the softwire mode of building special-purpose computers and other machines) raises anew the question: whether the Patent Office "freeze[s] ... patents to old technologies, leaving no room for the revelations of the new, onrushing technology." (Benson, supra, at 71.)

***42** B. "A Machine Is Not An Idea."

1. The Patent Office's "new use" argument does violence to the technological facts of computers.

The cases cited by the Patent Office do not support its "new use" position because they do not deal with the general-purpose computer or any other restructurable device.

The new use doctrine applies under the test set down by this Court in Roberts v. Ryer 91 U.S. 150, 159, where there is "a change only in form, proportions or degree, doing substantially the same thing in the same way by substantially the same means." In that case and in each of the other cited new use cases what was claimed was substantially the same structure as the prior art. [FN81]

> FN81. In Roberts v. Ryer, supra, the unpatentable new use of an icebox was a downards circulation of air through the food chamber while the old use had the air circulating upwards. In Ansonia Brass v. Electrical Supply. 144 U.S. 11, 18, the new use of paint was as a noncombustible insulation for electric wires carrying large electric currents needed for lighting; it was unpatentable over the old use of the insulating paint for electric wires carrying small telegraph currents. In General Electric Co. v. Jewel Incandescent Lamp Co., 326 U.S. 242, 247, 249, the new use of a second etching for frosted glass electric lamps was that of applying the etching to the interior of the glass. It was unpatentable in view of the old use of that second etching applied externally to electric lamps. In Exer-Genie, Inc. v. McDonald. 453 F.2d 132. certiorari denied, 405 U.S. 1075. the unpatentable new use was exercising with a machine; the old use of the same machine was as a fire escape device. In Old Town Ribbon & Carbon Co. v. Columbia Ribbon & Carbon Mfg. Co., 159 F.2d 379, the unpatentable new use of duplicating sheets was for a "gelatin pad" duplicating process, where the old use of the same sheets was for a "spirit" duplicating process. In Application of Zierden. 411 F.2d 1325. the unpatentable new use of a chemical composition was that of removing and preventing alluvium deposits in water systems, where the old use of the same chemical composition was to prevent deposition of carbonate scale in such water systems.

In this case respondent's claimed invention has an entirely different structure from that of the "existing" ***43** general-purpose computer. [FN82] The structure produced by the software programming is:

> FN82. The prior art in each of the cited cases had an old use. In contrast to these new-use cases, petitioner does not set forth any old use of the general-purpose computer in constructing a theory of nonpatentability based on "new use." The unprogrammed general-purpose computer is an incomplete machine that has no end use. Without the structure of a stored program, it does not

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operate, for the hardware and software are "interdependent," not "independent" as the Patent Office insisted in Benson. (See Transcript of Oral Argument, hereinafter, Tr. Benson, at 4).

"an integral part of the [special-purpose computer's] design structure," [FN83]

FN83. Burks, Goldstine, von Neumann, supra.

Respondent's patent claims call for a new combination of elements. Such combinations are patentable as specifically provided for in 35 U.S.C. § 112, 3rd ¶ , and as approved by the Court in cases from Burr, supra to Graham v. Deere, 383 U.S. 1. [FN84]

FN84. See also O'Reilly v. Morse, 56 U.S. (15 How.) 62; The Telephone Cases. 126 U.S. 1; Mackay Radio and Telegraph Co. v. Radio Corp. of America, 306 U.S. 86.

Just as the combination of components forming a novel logic circuit and the combination of logic circuits forming a novel functional circuit are patentable as machines or parts of machines, so are the special-purpose computers that are constructed by softwiring combinations of functional circuits. The universal characteristic of patentable combinations of elements in all technologies is that each of the elements has the "ability to perform ... in varied ways" (Br. Pet. 35) with other elements to produce new combinations. So, too, the general-purpose computer, that "storehouse of parts," produces a new machine combination when it interacts with a stored program. The "new use" issue does not apply to the new machine combination defined in the claims which has a structure different from any other combination. Petitioner's legal argument of "new use" is ***44** refuted by the undeniable fact that the general-purpose computer is a "storehouse of parts" structurable by and combinable with a stored program. [FN85]

FN85. An inventor of a general-purpose computer is no more "entitled to the benefit of all [its] uses" (Pet. Br. 36), than is the inventor of any other "storehouse of parts" such as the Erector Set or Tinkertoy, or a set of electrical components. Nor would the inventor of an Adder circuit in IBM's 1400 be entitled to use the IBM 1400 free of IBM's patents. The inventor of a patented element of a combination has a right to exclude others from use of that element in a combination, 35 U.S.C. § § 271, 281, but he does not by a patent to that element acquire any rights to use of someone else's combination by reason of the element being usable therein.

Petitioner's brief makes it clear that his entire case is directed not against the claimed special-purpose computer, but against the stored program as a mode of construction for machines. Petitioner specifically attempts to exclude respondent's equivalent hardwire embodiment (A. 66-67) as "unrealistic" (Br. Pet. 33). Petitioner is unable to deny that the claims define a special-purpose computer whose general controls can be built with equivalent hardwire. The claims do not call for a stored program for the general controls. A hardwire embodiment may be quite realistic, as the cost for hardwire construction is lowered. Petitioner attempts to exclude the hardwire mode of construction from consideration in this case, because none of the "new use" arguments could be applied to hardwire even sophistically.

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As to the softwire embodiment, both the C.C.P.A. and Board below agreed that "a new program makes an old general purpose digital computer into a new and different machine" (Pet. 19A) Judge Rich below specifically acknowledged "the validity of this principle" (Ibid.) noting that the "court has been through that many times" (Ibid.); there has never been a dissent on that finding of the facts of computer programs. [FN86]

FN86. The Board of Appeals specifically expressed its agreement with the C.C.P.A. on the validity of this restructuring principle (Pet. 28A). The Board, without in any way modifying its support of restructuring, also indicated in a formal rejection under 35 U.S.C. § 112 (Pet. 30A), that the "meaning one chooses to assign outside the computer to a particular configuration of 'bits' in its memory" is not "structural." Though a program changes the general-purpose computer to "a different machine," such "meaning" does not. Respondent does not disagree with this position and does not assert patentability based on the difference between "a file of stock numbers rather than a file of sums of money." (Ibid.) Such a claim limitation does not affect patentability under 35 U.S.C. § 101, but goes to the end use of the invention and to the scope of coverage of the patent that is requested. See McClain v. Ortmayer. 141 U.S. 419. The Board, however, revealed its lack of understanding of respondent's invention as defined in claims 20-24 (A. 107-9) for the "means for identifying" that the Board refers to (Pet. 30A) are defined in the claims as identifying the "category records" and the "totalizing records" and not "an 'account,' or a 'type of transaction,"' as its opinion states. This identifying means, as explained in the patent application (A. 18, 19, 47, 54, 73, 81, 82), tests the "initial identifier field" 164, 167, 170, 171 for the ledger format control signals. This "means for identifying" is an important part of the mechanism for co-action between the master and general controls, which the Board's opinion did not notice, unlike the C.C.P.A.'s (Pet. 5A).

***45** Petitioner's formulation of his "new use" theory is unsupported by any evidence of the structure of the programmed computer. He produces no facts in support of his theory and ignores the physical changes in the computer's circuitry that cannot be seen with the naked eye. These changes can be fully identified and measured internally, as well as externally by visible evidence of the transformation of input data to processed output data. Petitioner seems to scoff at an inquiry into the structure of the special-purpose computer and to argue, by analogy, that one can understand the dynamic structure of a river simply by observing its outer form (Br. Pet. 35, n. 25). Respondent submits, that, just as it is necessary to "step into" (Ibid.) a river to understand its "hierarchical ***46** structure" [FN87] that reveals the river's inner structure [FN88] and the "different" aspects of the "same river" (Ibid.) so it is necessary to open the doors of the computer housing and investigate its innards, for it also forms a hierarchical system that reveals its structure and the differences produced by a stored program.

FN87. A. Iberall, "Viable Systems," supra., p. 7.

FN88. "Consider a river flowing downstream as a constant current source. (The velocity field that makes up the river is derived from a gravitational potential and from ground waters.) Consider small particles carried by the

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> stream. As a result of gravity, they fall vertically. Yet, upon their striking the bed of the stream, there is an interaction via hydrodynamic forces ... The collection of these particles may now be characterized, by a continuum description of the bed load of the river, as a dynamic entity that will be subject to gross dynamic laws as the bed load interacts with elements in the macroscopic river-field (such as bends, changes in river shape or cross-sectional area, or changes in the character of the soil)." (Ibid.)

Not only is petitioner's "new use" theory unsupported by any evidence in the record, it is contradicted by the evidence and by statements of the experts. Moreover, both the C.C.P.A. and the Board of Appeals below agree that respondent's invention is a "new machine" not a "use." Under these circumstances, the court has ruled

> A court of law, such as this Court is, rather than a court for correction of errors in fact finding, cannot undertake to review concurrent findings of fact by two courts below in the absence of a very obvious and exceptional showing of error. [citations omitted]

Graver Tank & Mfg. Co. v. Linde Air Products, 336 U.S. 271, 275 (1949).

Petitioner's "new use" case [FN89] culminates in a self-serving and deceptive metaphor which compares the ***47** stored computer program with recording devices such as the piano roll in the player piano. Overlooked entirely is the basic flaw in the analogy that the general-purpose computer is restructured when reprogrammed but the player piano is not restructured when a different piano roll is inserted. The fact that the resultant special-purpose computer has a new structure excludes the possibility that it is merely a new use of an old structure. Since the Patent Office has asserted to the Court that "precisely the heart of our case" [FN90] rests on this "piano roll" metaphor, it is dealt with in greater detail than it would otherwise merit.

> FN89. The "new use" theory is used spuriously to suggest (Br. Pet. 35-36) that the C.C.P.A. decision below would somehow give respondent a "partial monopoly" (whatever that is) to a general-purpose computer in the public domain. It is true that upon the expiration of IBM's patents on the hardware programming in the IBM 1400 computer, "their subject matter will fall into the public domain" (Ibid.) but without any restriction by reason of the patent requested by respondent. First, respondent's invention can also be hardwired and therefore is not limited to being constructed with a general-purpose computer, and with any particular one at that. Second, one or more of the elements of combination patents often are previously patented without the combination patents in any way removing the elements from the public domain. See Cantrell v. Wallick, 117 U.S. 689, 694. The parts of the "storehouse of parts" of the IBM 1400 may be combined in any way without restraint so long as they are not structured into respondent's machine, just as patented or unpatented transistors can be combined into patented television sets without removing anything from the public domain. The fact that the Erector Set (or any other kit of building blocks) can be used to construct and thereby infringe a patented combination does not take anything out of the public domain, neither by "partial monopoly" or otherwise, for the patented combination is not in the public domain until its patent expires. As the Court said in United States v. Dubilier Condenser Corp., 289 U.S. 178, 186: "An inventor deprives the public of nothing which it

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enjoyed before his discovery, but gives something of value to the community by adding to the sum of useful knowledge." See also the Briefs amici of the American Patent Law Association, p. 11, et seq., and of Software Associates, Inc., p. 24, et seq.

FN90. Tr. Benson, p. 17.

Programs have been developed to structure a general-purpose computer into a musical synthesizer (see Appendix) [FN91]--an electronic counterpart of petitioner's ***48** player piano. The player piano, however, whatever piano roll it may play remains unchanged--still a player piano, with the same structure it had before since the player piano is not restructurable. The piano roll is merely input data, a record of the piano keys to be struck [FN92] and not a program. [FN93]

FN91. The musical synthesizer receives as inputs, punch card records (like a piano roll) of the musical notes to be reproduced. The synthesizer program configures the circuits to generate electrical signals corresponding to the desired musical tones which it may record as output on magnetic tape to be played later, or it can play the music at the same time with appropriate playback equipment. In the musical synthesizer shown in the Appendix the computer program provides additional structure for the illustrated general-purpose computer so that the input to the computer is in the form of sheet music notation (as the photograph illustrates), from which the programmed machine generates the output for reproducing the corresponding music. A composer can write his music and have it played back immediately.

FN92. A piano roll is a musical recording and any innovation in the music is not technological.

FN93. A variant of the piano roll metaphor is petitioner's comparison of the player piano and music box (Br. Pet. 16). Both the player piano and music box are special-purpose machines--machines for playing different musical recordings. The only difference is that the piano roll is more easily replaceable than is the recording disc or drum used in the music box. Neither is a general-purpose machine; neither can be changed to be other than what they are. Both the player piano and music box, unlike the incomplete general-purpose computer, are fixed-purpose and complete machines requiring only input data to operate; the input data are the piano roll and recording drum, respectively. A "fixed-wire computer" (Br. Pet. 16) is also a special-purpose machine which receives input and produces output in accordance with its own "rule of action." However, the general-purpose computer is in a unique class of devices--once structured by the addition of programming it becomes a special-purpose machine with the rule of action of the particular fixed-wire computer or other fixed-purpose machine it was structured to become.

The spurious nature of the piano roll metaphor may be further seen by comparing the elementary functional circuits of the general-purpose computer to the end use of the programmed computer. A general-purpose computer ***49** can be restructured into an infinite variety of special-purpose computers, or fixed-purpose machines ranging from the musical synthesizer to a talking computer, or one for recognition of printed characters, or a computer-operated typesetter or airline reservation system.

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In any case as the above examples illustrate, the elements that make up the general-purpose computer are not related to its ultimate function. In the case of the musical synthesizer, the functions of the Adder, Compare, Fetch and Store circuits and Branch control are unrelated to the synthesizing of music. This is also true of these other special-purpose computers or machines, all of which are structured out of the same "storehouse of parts," the functional circuits of the general-purpose computer. [FN94] The elementary nature of their operations do not foretell the types of machines that can be produced from them. [FN95]

FN94. An important characteristic of a special-purpose computer is its ability to make "decisions," that is, to alter its sequence of operation depending upon the occurrence of certain conditions of operation or in the input or output data. The general-purpose computer is constructed with Compare and Branch circuits so that it can be restructured by a program to incorporate "decision" control mechanisms; that characteristic is nonexistent in the player piano. See amicus Brief herein of Applied Data Research, Sec. 2A for a discussion of the "decision" characteristic of special-purpose computers.

FN95. In the case of respondent's invention there are some relatively simple arithmetic operations that form a part of the system. However, it is not the arithmetic operations as such that are the novelty of this invention.

Respondent's invention lies in the structuring of the control mechanisms in two different parts of the overall computer system, and the control of one by the other. This construction leads synergistically to the end result of each user being able to communicate directly with the computer and tell the computer how to keep his books with all his own individuality, and to do this in concert with a thousand others, each having the same freedom of action in keeping his financial accounts in his own way. ***50** This "synergistic" result compared to the "several effects" of the individual function circuits (Add. Compare, Branch) is "an effect greater than the sum of the several effects taken separately." Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 61 (1969). In contrast to respondent's adaptive machine, in the player piano the strings and their tones have the identical relation to the musical end use whatever piano roll is played. The structure of the piano is never changed.

2. The claimed invention is a patentable machine, not an "idea" or "method of doing business."

Unlike other record-keeping machines, [FN96] which only have one set of controls that directs the processing of the data in the data files, respondent's invention has two sets of controls: a set of general controls for operations common to most users' accounts and a set of specific master controls in the data file of each individual account. This structure of respondent's apparatus gives it the flexibility and adaptability to handle any small user's ledger format. Because there is a master control in each data file, respondent's machine can implement a different bookkeeping system for each customer without the burdensome and inflexible requirement of building into the general program control each individual bookkeeping method and ledger format. Locating the master controls in the data files greatly simplifies the incorporation of changes in each individual customer's bookkeeping system; it is not necessary to change the general control. It is the configuration

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of machine elements and not the particular bookkeeping system a user has that gives the invention its unique properties. He can have any bookkeeping system he desires with this machine.

FN96. Note particularly the prior art cited by petitioner.

The C.C.P.A. recognized that the gist of respondent's ***51** invention was a machine structure [FN97]--the interacting "general control" and "master control" (Pet. 5A)--and held that it was not a method of doing business:

FN97. The C.C.P.A. found the claims were "in typical means-plus-function language, which is especially sanctioned by the third paragraph of § 112, the appealed apparatus claims are clearly drawn to a 'record-keeping machine system"' (Pet. 12A), and that "the claimed apparatus automatically performs the identifying operations [of the claims]; those operations are neither actually performed by a human being nor can we imagine how they could realistically be performed by a human being." See In re Bernhart. Pet. 13A)

The appealed apparatus claims are not drawn to cover either a method of doing business or even a method of bookkeeping ... [o]bviously, banks would be free to so expand their services and use any apparatus they may desire except the apparatus set forth in appellant's claims." (Pet. 14A) (emphasis the court's).

Banks and others are assisted by machines such as respondent's invention in performing additional services for their customers. If they did not wish to use respondent's invention, they would be free to use any other machine construction for performing those identical services, including those proposed by the Patent Office and others. [FN98] Thus, respondent's invention, like a pen, a typewriter or a cash register, can be used to assist banks or others (such as accountants and data processing centers) in performing services for small businesses, professionals, and others in keeping their financial ***52** records, but would not inhibit anyone from engaging in such services so long as they did not use respondent's invention.

FN98. The Patent Office has suggested that the machine of the Dirks patent can be used for performing similar services and the Board of Appeals has proposed still another alternative mode of machine construction. Other non-infringing modes of machine construction are also available for performing the same service.
There is no infringement when the alleged infringing machine and patented machine "perform different functions, or in a different way, or produce substantially a different result." Machine Co. v. Murphy, 97 U.S. 120; see Cantrell v. Wallick, 117 U.S. 689, 695.

Unlike Gottschalk v. Benson, 409 U.S. 63, the invention involved in this case is not an "algorithm," nor a mathematical "procedure." In Benson, the Court made it clear that a monopoly for a mathematical algorithm was the issue. In this case no mathematical formula or series of steps is claimed. While the details of a software program are a series of steps, that construction does not convert a machine invention into an unpatentable algorithm any more than the fact that an automobile engine has an automatic control (e.g., a cam shaft) which causes a series of steps to be taken makes the auto engine unpatentable. In the automobile, the steps are

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mechanical, [FN99] in this case electrical; both are within the "useful Arts." In Benson, the Court was concerned with the steps of the BCD-to-binary conversion algorithm which were purely mathematical, therefore, outside the "useful Arts." It was the mathematical process and not the use of software as a mode of construction that was the defect in Benson; Johnston's invention is directed to an innovation in machine control structure, not mathematics and does not suffer from the Benson disability. Unlike Benson, the claims herein are limited to a particular art and technology, to a particular apparatus and machine, and to a particular end use. The only thing that would be patented by these claims is a machine. Burr v. Duryee, supra.

FN99. But the program control in an automobile has become more electrical as more complex automatic controls are found to be needed, and will soon be constructed with a programmed general-purpose computer.

The computer technology deals with a sub-human activity that superficially is associated with the mind. [FN100] ***53** Any patent to respondent's special-purpose machine would not cover any "abstract idea," because any bank is free to practice record-keeping by any manual or machine process. The only limitation is respondent's specific machine construction, which is no more the embodiment of an "abstract idea," than is a novel structure for an adding machine.

FN100. "[i]n the words of James Clerk Maxwell, 'the human mind is seldom satisfied, and is certainly never exercising its highest functions, when it is doing the work of a calculating machine' ... Just as the use of man's muscles for pumping water was inefficient, so was the use of his mind for carrying out calculations ... Computing is thus subhuman in that it calls on very few of man's manifold abilities and yet is fundamental to many of his other activities." Goldstine, supra, at p. 343.

The Constitution defines the field in which the patent power may be applied as the "useful Arts," U.S. Const., Art. 1, § 8. [FN101] This limitation to the technological arts [FN102] has been implemented by the congressional command that, inter alia, machines are to be granted patents. As the Board stated (Pet. 31A-32A), "technological" is defined as "... improvement in technical processes that increase the productivity of machines and eliminate manual operations." Respondent's invention on both scores is clearly technological.

FN101. Graham v. John Deere, 383 U.S. 1.

FN102. As noted by the court below, the "useful Arts" are the "technological arts," (Pet. 13A).

Claims outside the technological arts for mathematical formulas and algorithms, laws of nature, and natural phenomena, are unpatentable; in this category have been included methods of doing business. [FN103] Compare Seagram & Sons v. Maryall, 180 F.2d 26 (claims defining method for sampling consumer preferences in beverages, outside the technological arts held unpatentable subject matter); Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 174 F.2d 547, (concept of an outdoor movie business to show movies to people sitting in their automobiles was not within the technological arts, hence, unpatentable, though the theater construction itself

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would be patentable as a "manufacture" if new and unobvious, and specific claims defining concrete embodiment of the drive-in theater were viewed as technological and their ***54** non-obviousness tested in the ordinary way, by comparison with the prior art); [FN104] O'Reilly v. Morse, supra a claim for the general idea of transmitting messages at a distance using electromagnetism was held not to be defining a particular technological advance, hence, unpatentable, but claims defining specific electromagnetic apparatus for transmitting messages at a distance, held to be within the technological arts, hence, patentable).

FN103. See Guthrie v. Curlett, 10 F.2d 725.

FN104. Claims held unpatentable on obviousness?? not on grounds of statutory subject matter.

The C.C.P.A. recognized that machines such as respondent's are squarely within the technological arts, hence, patentable subject matter. In its attempt to characterize such inventions as outside the technological arts, the Government misrepresents their nature. The significance of the specific machine structure consisting of the combination of a general control and separate master controls for each user's individualized record-keeping is ignored in petitioner's brief. By ignoring the machine nature of the invention, the Patent Office attempts to convince the Court that all that is claimed is the "idea of having banks program and use their computers to provide an additional service for their customers." That statement is simply false: all that is claimed is a specific machine structure which enables computer centers, accountants, banks or anyone else to do so. Any device with a different structure based on "the idea" would not be covered by the patent, and banks would be free to use different apparatus than the particular special-purpose computer defined in the claims to provide the same services respondent's machine provides.

The Patent Office also mischaracterizes the innovative process that goes into the development of a computer program. It suggests (without any evidentiary support whatsoever) that once the ultimate "purpose" of the invention is formulated, the rest of the development of the ***55** program is routine (Br. Pet. 16-17). [FN105] Since the Patent Office attempts to portray the "purpose" of respondent's invention as well as of all programs as a mere abstract idea, arguably the implementation of that abstract idea would have to be unobvious. Such a rule, however, is only invoked in cases such as Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130, which deal with some innovation in the non-technological arts and is simply a guard against patents for tangible embodiments that are nothing more than the underlying unpatentable subject matter. [FN106]

FN105. The innovative process in software programming as in hardware programming relates to overcoming machine problems and "technological roadblocks," (Computers in the 1980's, R. Turn. 1974, p. 21). See the ADAPSO Brief amicus herein, pp. 26-30 for a discussion of "The engineering of software" and "The invention process in software."

FN106. Even if the Funk rule would be applicable to this case, it is submitted that innovative features such as the interacting machine controls identified by the C.C.P.A. herein are in the design of a specific machine structure, not

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in the formulation of an ultimate purpose.

Petitioner misstates the application of the rule of unobviousness under 35 U.S.C. § 103. The invention as a whole must be considered in determining patentability, both conception and the claimed construction; Graham v. Deere, 383 U.S. 1, 32. Respondent's conception is not a method of doing business, however useful it may be to businesses. Respondent recognized the problem of providing a machine so constructed as to permit any small user to obtain the benefit of computer processing without losing the individuality of his record-keeping format and procedures. His successful solution to that problem is a novel adaptive computer construction with a combination of interacting master and general control mechanisms that permits the user to supply his ledger format directly to the computer to be effective as controls without requiring the design of a special set of general controls for that format.

***56** The discovery of the problem is part of the "invention as a whole" that must be considered for unobviousness, Eibel v. Paper Co., 261 U.S., 45, 68; United States v. Adams, 383 U.S. 39, 52. In addition, the conception of the solution of the problem as a set of master controls for retaining the individualities in users' ledger formats is part of the "invention as a whole." Likewise, the implementation of the particular general controls and of the co-action with the master controls, the former functioning as a slave to the latter, is part of the "invention as a whole," as discussed in greater detail below in Section IV dealing with the unobviousness of respondent's invention. [FN107]

FN107. For a more extensive discussion of this question, see Brief amicus for the American Patent Law Association, pp. 7-10.

The differences between process and machine are fundamental in dealing with the issues in this case. As the Court said in Tilghman v. Proctor, at 728, 12 Otto 707, 728:

A machine is a thing. A process is an act, or a mode of acting. The one is visible to the eye; an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed.

The dichotomy between machine and process is emphasized in Burr v. Duryee, supra, at 570: "A machine is not ... an idea." The process is the intangible; the machine is the tangible.

During oral argument in Benson, the Patent Office distinguished a machine claim from a method claim as follows (Tr. Benson, 10):

But in the case of machines or other tangible products, the patent is not granted on the idea but on the tangible object itself, so that the ideas themselves are not monopolized except in the limited tangible form in which they are embodied in the machine or manufactured product.

***57** This Patent Office statement completely contradicts the Patent Office's red herring argument (Pet. Br. 36, n. 28) that the "effect of a machine patent would be even broader than that of the process patent." See also Waxham v. Smith, 294 U.S. 20 (1935): One "does not avoid infringement of [patentee's] method patent merely by employing it in a machine of different structure than [[patentee's]" (emphasis

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added) and Benson, supra, 69-70, quoting a similar statement with approval from Cochrane v. Deener, 94 U.S. 780.

Thus, the entire approach of petitioner in this case has been not to deal with the merits of respondent's invention as a machine, but instead to wishfully designate it an "idea," a "use" and a "new use" or a "method of doing business" so that it can be challenged as an unpatentable abstraction. It is clear from the claims that respondent defines his invention as a machine; it operates as a machine; it provides a machine solution to a machine problem and produces an end result that only a machine can produce; for as the court below found (Pet. 13A) "nor can we imagine how [the apparatus operations] could be realistically performed by a human being." Calling this invention an "idea" scores of times does not change its physical character, but such an obfuscatory attempt to convert a "machine" into the abstraction of a "process" to prevent the proper application of the patent law is precisely what this Court condemned in Burr v. Duryee, supra, at 577:

> In this case we have an attempt to convert an improved machine into an abstraction, a principle or mode of operation, or a still more vague and indefinite entity often resorted to in argument, an "idea." Those who use the latter term seem to have no fixed idea of what they mean by it. But it may be used ... successfully to mystify a plain matter.

Petitioner's case against the patentability of all programmed computers is similarly fabricated by designating ***58** them all as "ideas" rather than by analyzing their structure as machines. Not only is there no authority for removing any part of a machine from patent protection by reason of the manner in which it is constructed, it violates the clear mandate of Congress that there be no such exclusions. The enormity of petitioner's request for an adverse Court ruling on computer programs is that it would exclude the most complex technology known today from the patent system.

III. Equal Protection Requires that Respondent's Machine Invention Be Given the Same Patent Protection Afforded any New and Unobvious Machine.

Petitioner's classification of a softwired special-purpose computer such as respondent's invention as non-patentable subject matter lacks any rational basis in fact; hence, it violates respondent's equal protection rights under the Fifth Amendment. [FN108] Respondent may not be denied patent protection for his machine invention solely because it is software-embodied absent some rational basis for the discrimination, see Morey v. Doud, 354 U.S. 457, 465 (1967). In that case the Court found arbitrary, and therefore unconstitutional, legislation which exempted the American Express Company from requirements imposed on all other vendors of money orders. The same sort of arbitrary economic favoritism condemned in that case is at the heart of the denial of patents to inventors of software-embodied special-purpose computers while granting patents to inventors of hardware-embodied special-purpose computers. [FN109]

> FN108. While the Fifth Amendment does not contain an explicit Equal Protection clause, Equal Protection standards applicable to the Federal Government have been incorporated into the Due Process clause of the Fifth Amendment. See Richardson v. Belcher, 404 U.S. 78, 81 (1971); Bolling v. Sharpe, 347 U.S. 497, 499 (1954).

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FN109. Three different comparisons describe the discrimination against software. First, the Commissioner would grant a patent on the hardware embodiment of a particular special-purpose computer but not on the equivalent software embodiment of the very same machine. Second, the Commissioner would grant patents for the innovative machine products of the hardware manufacturers but not the innovative machine products of their competitors, the small software companies (see ADAPSO and ADR Briefs amici herein). Third, while machines as a class are patentable, 35 U.S.C. § 101, the Commissioner has singled out software-embodied machines and no others as unpatentable. These discriminations are all predicated on a myth of the non-machine--the bald assertion that a machine constructed with software is an "idea" in direct conflict with the rulings of the Court; Burr v. Duryee, supra.

***59** The instant case is even stronger than Morey v. Doud because the patent statute is by its terms generally inclusive. [FN110] This is not a case in which great deference need be given a studied intentional congressional act of exclusion since there was none. To the contrary, the patent policy urged by the Government here violates the Small Business Act [FN111] in that it discriminates against the small businesses which form the heart and core of the software products industry. Such an inconsistent action by the Government should certainly be predicated upon a sound legal basis rather than a Luddite [FN112] policy of ***60** opposing technological advances. No judicial sanction should be given a strained administrative interpretation that runs counter to the clear import of the statute. While an action of the Commissioner that is consistent with an explicit congressional directive is entitled to deference, when he acts on his own discretion and without congressional support, "a very different question is presented." Boyden v. Comm'r. of Patents, 441 F.2d 1041, 1044 (D.C. Cir. 1971).

FN110. "[W]hoever invents ... any new and useful ... machine ... may obtain a patent therefor...." 35 U.S.C. § 101 (emphasis added). The only exception from patentability of a specific machine technology is that of atomic weapons; see 42 U.S.C. § 2181; but Congress otherwise provided for incentive compensation 42 U.S.C. § 2187(b), (3). There Congress made explicit the exception, reinforcing its mandate that all other machine technologies were intended to be patentable subject matter.

FN111. 15 U.S.C. § 631, provides: "It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect, insofar as is possible, the interests of small-business concerns in order to preserve free competitive enterprise ... and to maintain and strengthen the over-all economy of the Nation."

FN112. "We are probably now at about the comparable point in time in the Computer Revolution to that in the Industrial Revolution when the Luddites were vainly smashing equipment." H. H. Goldstine, supra, p. 347. For the last decade and more, there have been hysterical arguments raised against the patenting of software-embodied inventions. First Amendment questions raising the spectre of complete computer domination, panicked fears of the undermining of the patent system, concocted theories of machines being "ideas" and of administrative convenience, have been among the many short-lived stratagems

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> put forth to deny recognition to the uncontrovertible advances of software technology. Must we be so fearful of humankind's ability to utilize technology beneficially that it is necessary to stonewall against further technological advancement by denying its existence and discouraging its forward thrust.

The Commissioner of Patents offers no justification related to the purposes of the Patent Act for his classification of software inventions as unpatentable. He does not deny that all machines are patentable subject matter. Instead, the petitioner defends the discrimination with the bald mischaracterization of the programmed general-purpose computer as an "idea" and not a new machine. This strained unrealistic attempt to rule out an entire machine technology from the patent laws cannot withstand scrutiny. While there is much verbiage in the petitioner's brief that disparages the machine nature of programmed general-purpose computers, he has not presented one bit of supporting evidence to any tribunal in this case. [FN113]

> FN113. The C.C.P.A. has long held that programming a general-purpose computer structures the computer into a different machine. The Board of Appeals so ruled in respondent's favor in this case (Pet. 28A) holding that the invention is a machine. Petitioner is barred by the patent statutes on appellate jurisdiction from contesting that finding here (see Section I, supra).

***61** When the Patent Commissioner singles out for exclusion the economically struggling segment of the data processing industry, and has favored the "economic" interests of the "collective forces of major hardware (i.e., computer) manufacturers and their representative associations," [FN114] judicial protection against unjustified discrimination is especially necessary. That this is so, is made painfully clear by the monopoly conditions which exist in the computer industry and which the Government admits has proved so harmful to the software products industry and to our national interests (see ADAPSO Brief herein, "The Absence of Competition in Software," p. 3, et seq.). In Dukes v. New Orleans, [FN115] the court, quoting Morey v. Doud, supra, held that favoritism of a particular segment of an industry without apparent reason is discrimination of "unusual character" requiring "careful consideration." 501 F.2d at 710. Although giving great deference to governmental actions in the economic sphere, no rational basis was found to support the discrimination in that case, and it was struck down as unconstitutional. [FN116]

> FN114. Judge Rich's dissent below, Pet. 20A.

> FN115. 501 F.2d 706 (5th Cir. 1974), appellee's motion to proceed in forma pauperis granted, 95 S.Ct. 1556 (1975). In that case, an ordinance which banned food vendors from New Orleans' Old Quarter unless they had been in operation for 8 years was struck down as unconstitutional since the classification bore no rational relationship to any legitimate state interest.

> FN116. See Pavone v. Louisiana State Board, 364 F.Supp. 961 (E.D. La. 1973), aff'd. 505 F.2d 1022 (5th Cir. 1974) (one licensed to cut only women's hair could not be prohibited from cutting men's hair since there were no relevant differences between the two); Bolton v. Texas Board, 350 F.Supp. 494 (N.D. Tex.), aff'd. 409 U.S. 807 (1972).

The form of construction of a special-purpose computer -- with hardware or software

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-- bears no relationship to the patent law or any other legitimate government interest. The "useful Arts" are promoted equally by hardware and software patents. In fact, the exclusion of software ***62** patents has had a severely detrimental effect on the functioning of the patent system. Since hardware and software can be alternative embodiments of the same machine structure, it is necessary to conduct a search of the prior software art to determine whether a particular hardware invention is novel. [FN117] The lack of software patents means that there have been inadequate search facilities for hardware. [FN118]

FN117. The 1966 Report of the President's Commission on the Patent System (reprinted in S. Doc. No. 5, 90th Cong., 1st Sess.; p. 21) reflected the inaccurate and one-sided view of the hardware manufacturers that the software state of the art is irrelevant to hardware. It is to be regretted that the President's Commission permitted itself to be used as a vehicle for the dissemination of this technologically unsound point of view. Much of the innovation in hardware was and still is first achieved in software. Software prior art is as essential as the hardware prior art to adequate examination of the novelty of a hardware-implemented invention. Similarly, both are needed for examination of an equivalent software-implemented invention.

FN118. Delinquent in its duties for many years, the Patent Office finally in 1972 "initiated a pilot program, with the cooperation of the Bureau of Standards, to develop techniques for classification and searching of the computer programming art." (See Pet. Br. Benson, p. 31). Since no longer is the argument being raised by the Patent Office about inadequate search facilities, one must conclude that the problem has been solved. The tragedy is that so-called "search facilities" were permitted to become a problem at all. Only the hardware manufacturers benefitted during the interim period because it meant that the Examiners were being deprived of the proper research facilities to evaluate the so-called "hardware" inventions, thereby seriously undermining the entire credibility of the patent system. Fortunately, the Patent Office has apparently, albeit belatedly, taken corrective action.

Different treatment based on irrelevant distinctions is unconstitutional, Mayhue v. Plantation, 375 F.2d 447 (5th Cir. 1967). [FN119] In this case, since invention can take ***63** place equally in hardware and software (the choice of construction often being a matter merely of "trade-offs") and since the two embodiments are technologically equivalent, both most be treated identically for purposes of the patent law. [FN120]

FN119. An ordinance establishing longer hours during which taverns could sell liquor for off-premises consumption than could package stores was struck down since the nature of the selling establishment was irrelevant to the state's purpose of regulating sale of liquor for off-premises consumption.

FN120. See American Trust Co. v. South Carolina State Board, 381 F.Supp. 313 (D.S.C. 1974) holding that all domestic corporations, whether controlled by local or out-of-state interests, were equally competent to serve as executors and administrators, hence, discriminatory statute against out-of-state interests was unconstitutional.

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The Government's suggestion of alternative modes of protection for software innovations, such as trade secrets or copyrights, [FN121] are inadequate and inappropriate to the task, and destructive of the constitutional purpose of the patent system as an incentive to machine innovation. [FN122] There is no evidence of any intent of Congress to relegate software inventors to reliance on other means of protection.

FN121. Here, too, with respect to copyrights, the 1966 President's Commission allowed itself to be used as an instrument to becloud the issue. The recommendations of the 1966 President's Commission seeking to deny patentability to software-implemented inventions were soundly rejected by Congress; see H.R. 5924, proposed, 35 U.S.C. § 106, 90th Cong., 1st Sess. (1967).

FN122. The "poor-quality software" that presently exists and the need for the incentive of the patent system is described in the ADAPSO Brief herein, pp. 6-11.

Copyright protects particular expression, not machine structure. There is no requirement of innovation, only originality; therefore, a copyright would not protect the machine configuration that is at the heart of respondent's invention. The fact that a "program" can be represented as a list of computer operations is no more significant than the fact that a radio circuit can be represented in a schematic diagram. An innovative radio circuit would not be protected by a copyright on a drawing and the special-purpose computer that is respondent's invention would not be protected by a copyright on a program listing.

***64** Trade secrecy is not only inadequate, but forced reliance on it violates the patent policy of disclosure which is needed to advance the "useful Arts". To the inventor, it is burdensome and often impossible to assure the complete secrecy that is required to retain the value of the innovation. Beyond this, reliance on this mode of protection has the counterproductive effect, opposed by public policy, of deterring disclosure of software innovations, hence, inhibiting the progress of the "useful Arts." Neither trade secrecy nor copyright is a substitute for equal treatment under the patent law.

In sum, the petitioner's arbitrary refusal [FN123] to grant patents for software inventions, in addition to violating the clear command of the statute, is a deprivation of the inventor's equal protection rights. The petitioner admits that all machines are patentable subject matter and offers no rational reasons for excluding the software machine technology. All the evidence establishes conclusively that respondent's software invention is a new machine. The Board of Appeals so found and the Commissioner, petitioner herein, is bound by that ruling. Petitioner's only answer to the equal protection dilemma is the bald assertion that the invention is a "use" not a machine. Without any evidentiary support, contrary to the views of both the Board and the C.C.P.A., and not jurisdictionally before this Court, that assertion cannot justify nor sustain an unconstitutional Patent Office policy of wholly irrational and unequal treatment.

FN123. In 1968, the then-Commissioner of Patents stated: "The present Office policy of refusing patents in this [computer program] field has acted as a

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> strong deterrent to the filing of applications." (Commissioner Brenner, supra, p. B-12) By its action, the Patent Office acted legislatively in opposition to the patent statutes and to the Small Business Act. While the most direct sufferers of this Patent Office policy are the software products companies engaged in innovative machine building, it is a fact that the loss is suffered by the whole nation which is deprived of the knowledge that would be disclosed to it by the award of a patent.

***65** IV. Respondent's Machine Invention is Unobvious in View of the Prior Art.

Both tribunals below found that respondent's invention is a "new machine"; the remaining question is whether this machine considered "as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art ..." 35 U.S.C. § 103. The test of obviousness requires that the differences between respondent's claimed invention and the prior art be considered to determine "obviousness or unobviousness." Graham v. Deere, supra.

The Patent Office relies on two prior record-keeping machines as prior art in this case. It concedes by its silence that neither of the alleged prior machines is concerned with the specific machine problem of providing an automatic record-keeping machine that would enable a large number of small users to get the benefit of large-scale electronic computer equipment and still continue to use their individual ledger format and bookkeeping methods. Respondent's machine achieves that end result--the alleged prior machines do not, and the Patent Office does not suggest that they do.

The patent claims (Pet. 5A) call for an automatic record-keeping machine which has two sets of controls, as the C.C.P.A. found, (Ibid.) "a master control" and "a general control." The latter functions as a slave to the master controls, which contain the controls for all of the variations in ledger formats and bookkeeping methods that may exist from one user to the next. The general controls contain the controls that are common to the various users; they configure the circuits to identify the particular master controls in the data filed and perform the combinations of operations called for by the master. The master controls are retained in the date files so that they can be changed easily as though they were data. By this construction and the "dynamic interrelationship" (Br. ***66** Pet. 36) between the two sets of controls all the variations in control can be built into the machine without the expense and difficulty of designing a general control for specifically processing each variation in ledger format. [FN124]

> FN124. Petitioner's summary of claim 20 omits all mention of these controls and their interrelationship; this summary (Br. Pet. 5) is inaccurately presented in indented format as though a quotation.

The claims call for the entire context of a special-purpose computer, including input and output devices, a memory, a processor and the interrelated master and general controls for performing the specific record-keeping operations, so that the machine adapts to whatever variations in ledger format a user may specify. Thus the combination of elements defined by the claim is that of a completely automatic machine for performing the record-keeping.

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The C.C.P.A. found that the alleged prior machines are not concerned with the same machine problem nor have they arrived at respondent's machine solution; they "simply are not suggestive of the subject matter of the appealed claims." (Pet. 16A)

Neither of the prior machines remotely suggests the two sets of interacting controls that are at the heart of the respondent's invention. For example, as the C.C.P.A. pointed out (Pet. 13A), "the claimed apparatus automatically performs the identifying operations." This "means for identifying," as set forth in the claims, is the control mechanism of the general controls that interacts with the master controls to carry out the control operation called for by the master controls. [FN125]

> FN125. It is clear from Dirks that his machine system employs a uniform format of programming, with the location of all of the items of data being pre-arranged, i.e., "the data is recorded in sequence in a track and is therefore readily accessible.... The program has merely to direct addition or subtraction." (A. 106, col. 26, lines 41-3). This is in direct contrast to respondent's system, in which the circuits first identify what types of operations are called for by the user's ledger format in the master controls. These latter controls are directly associated with the data on which the operations are to be performed, so that the data is intermixed with controls and not "recorded in sequence" as in Dirks.

***67** The Patent Office nowhere suggests: (a) that either of the alleged prior systems is constructed in the same way as respondent's machine, inter alia, with the same combination of controls; nor (b) that either would operate in the same way as respondent's machine with the controls interacting to adapt to each user's ledger format; nor (c) that either would produce the same end result of respondent's machine of processing the financial records of large numbers of small users each with an individual ledger format.

The Board of Appeals' discussion of the resemblances between its proposed modification of a prior machine and respondent's is limited to a discussion of the use of "category codes" on the checks and deposit slips and in the ledger. [FN126] Respondent does not rely on the novelty of "category codes" for patentability; nor on the "meaning" of the coded machine signals. [FN127] The Dirks' machine could be constructed with "category codes" to identify the various categories of records and any desired meanings can be assigned to the signals, but it would not be the same machine as defined in the claims. Such a modification of Dirks would neither infringe the claims nor would it anticipate the claims. For even if the alleged prior machines contained the asserted category codes, they nevertheless would not have the two sets of interacting controls, nor would they provide a machine which would automatically keep records for a large number of individual users having different ledger formats and bookkeeping records. They would not be ***68** multi-format machines, and especially not respondent's claimed adaptive multi-format machine.

> FN126. Judge Markey's dissent acknowledges that respondent's invention is not disclosed in the prior art and, his dissent is likewise limited to the question of whether "category codes" would be obvious.

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FN127. See n. 86, supra.

The Dirks machine is cited by petitioner (Pet. Br. 40, n. 33) to suggest that a machine is there disclosed which is usable for "networks of individual departments of a large business corporation" and for "personalized files." Dirks' solution to his problem is to provide a separate computer for each department (A. 97, col. 7 lines 57-61):

... to provide a complete satellite system of smaller personalized computers, in which a group of smaller computers cooperate with each other in a wire network for the exchange of data required at other places. (emphasis added)

The users served by respondent's invention are too small to afford even one of Dirks' "smaller computers." The use of a separate general program for each user's own ledger format was not a satisfactory solution to the machine problem confronted by respondent. Certainly, Dirks' use of a separate computer for each user is even less satisfactory (though it may be quite satisfactory for Dirks' problem of processing data for a multi-department corporation). Clearly, the claimed record-keeping machine herein is not even remotely suggested by Dirks.

The Patent Office, by pulling out of the Dirks patent various words, phrases and sentences, seeks to find in Dirks resemblances to respondent's system. This technique of misapplication of the Dirks patent to the claims was rejected out of hand by the Court below (Pet. 16A):

***69** We find that, with appellant's specification before them, the board and solicitor have merely chosen various portions of the Dirks apparatus and have attempted to read them upon various elements set forth in appellant's claims. [FN128]

FN128. With that technique, petitioner's searching (Br. Pet. 41) through the Dirks patent (respondent has deposited with the Court complete copies of the Dirks patent in a full-size type face) has come up with a sentence stating that in the Dirks system "programming is very easy and different programs are very easily coordinated." Dirks does not explain what programs are "coordinated" nor for what purpose, whether it is coordination among satellite computers or coordination performed by a programmer in designing the programs. Dirks clearly does not disclose the claimed two sets of controls with the interacting master and general controls. Respondent's invention makes it unnecessary to construct separate programs for the master controls, while Dirks requires separate programs for each of the "network" of "smaller computers."

Accordingly, respondent's invention is constructed differently, operates differently, and produces a different end result; the prior art is, as the C.C.P.A. found, "simply not suggestive of the subject matter of the appealed claims" (Pet. 16A). Essentially, the only resemblances between the alleged prior art and that of respondent are that they are both record-keeping machines. The differences are substantial differences and the invention considered as a whole is clearly not obvious. Graham v. Deere, supra.

***70** CONCLUSION

Petitioner is jurisdictionally barred from raising herein the "new use" which underlies the Patent Office opposition to the patentability of programmed general-

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purpose computers. In any event, the decision below should be affirmed for the reasons set forth above both as to the patentability of respondent's programmed computer as a machine and as to its unobviousness over the prior art.

***71a** APPENDIX

TECHNOLOGY REVIEW, MASSACHUSETTS INSTITUTE OF TECHNOLOGY VOL. 72, pp. 18, 19, MAY 1970.

La Machine Infernale

Music by Computers

Heinz Von Foerster, James W. Beachamp, editors

New York, John Wiley & Sons, Inc., 139 pp., $14.95

Reviewed by Stephen W. Smoliar Department of Mathematics, M.I.T.

This book is a collection of papers and sample recordings presented at the 1966 Fall Joint Computer Conference in a session entitled "Computers in Music" organized by Heinz Von Foerster.

M.I.T.'s Walter D. Bilofsky uses a PDP-9 computer adapted for sound synthesis and analysis. He is shown using a program, of his own design, for the construction of a musical score, which the computer plays using sounds designed with the help of a second, sound-specification, program, At right is the visual output of this program, which enables the composer to edit the characteristics of his chosen sound. (Photos: Don Estes)

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Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

• 1975 WL 173470 (Appellate Brief) Brief Amicus Curiae for Software Associates, Inc. (Oct. Term 1975)

• 1975 WL 173473 (Appellate Brief) Brief Amicus Curiae for Los Angeles and Philadelphia Patent Law Associations. (Oct. Term 1975)

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• 1975 WL 173468 (Appellate Brief) Brief Amicus Curiae for the American Patent Law Association. (Sep. 22, 1975)

• 1975 WL 173467 (Appellate Brief) Brief Amicus Curiae for Universal Software, Inc. (Sep. 03, 1975)

• 1975 WL 173464 (Appellate Brief) Brief for the Petitioner (Jul. 31, 1975)

• 1975 WL 173466 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Jul. 21, 1975)

• 1975 WL 173463 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Mar. 13, 1975)

• 1974 WL 175938 (Appellate Brief) Reply Brief for Petitioner (Oct. Term 1974)

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals.

Brief Amicus Curiae for California Patent Law Association.

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***1** I.

The Question.

Whether claims in the form authorized by 35 USC 112, to a machine embodying an invention meeting the statutory conditions for patentability of 35 USC 102 and 103, are unpatentable under 35 USC 101, solely because the claimed invention can be embodied in a general purpose computer modified by programming it to function in a specified manner.

***2** II.

Interest of the Amicus.

The California Patent Law Association is an organization of lawyers representing inventors in California. Its members have no special interest in the outcome of this case as far as the particular invention is concerned, but are concerned about the impact of this case on the development of the law. Our members are patent attorneys, both corporate and private; trial lawyers who act one day for a patent owner and the next day against the patent owner; as well as practitioners of all other aspects of the specialty of patent law. Again, in the year 1974, California leads the nation in the number of patents granted to its inventors. The great majority of these patents were prepared by members of our association. The largest state having the largest number of patents granted to its inventors, is also the home of the largest state-

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wide organization of patent lawyers. Our interest in this case is simply just and proper protection for inventions, no more and no less.

We approach this matter on the side of the respondent because we believe patent protection should be granted to any invention which satisfies the statutory criteria for patentable subject matter.

The California Patent Law Association is interested in even-handed administration of the patent law without regard to the technology out of which an invention arises. An invention is not excluded from the classes of inventions recited in 35 USC 101 merely because it relates to a computer or a computer program.

***3** III.

Consent.

The California Patent Law Association has received consent from both parties to file this brief amicus curiae. The letters of consent have been filed with the Clerk of the Court.

IV. Summary of Argument.

It is important that the question of what constitutes statutory subject matter under 35 USC 101 be distinguished from the question of what constitutes patentable subject matter under 35 USC 102 and 103. Even a claim that is not patentable may still define statutory subject matter.

The issue presented by this case that concerns amicus curiae is whether the claims presented in the application define a machine within the statutory meaning of 35 USC 101. Although Petitioner appears to contend that machines which are related to computers or computer programs should be treated differently from all other machines, the claims clearly define a machine.

A means-plus-function claim, expressly recognized as proper under 35 USC 112, does not cover a mental process or an idea as such, but only the implementation of the function by a mechanism or device, that is a machine.

Programming of calculators is a long-known technology. Calculators have been programmed mechanically to perform the addition, subtraction, multiplication, ***4** and division algorithms of arithmetic for hundreds of years. The art of programming the operation of other machines by various temporarily installed mechanical means, such as punched tapes and decks of punched cards, is more than 300 years old. The programming of general purpose digital computers by the use of stored programs, such as replaceable punched tapes and punched cards, was first conceived about 140 years ago and first put into practical use before 1944. Such programming is excitingly different and more advanced than programming with only gears, levers, cams, etc., and opens up vast areas of invention.

When a program device, such as a deck of program cards, is combined with a modern general purpose digital computer, the computer is transformed into a machine that is different from the original general purpose computer. In this process, the states of memory elements, such as magnetic cores, electromechanical relays, or the voltages on electronic elements in the old computer, are transformed, creating a new interdependence between those elements and the rest of the computer and external

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devices. Unlike a player piano that merely translates holes in a paper roll into sounds on a one-for-one basis, [FN*] such a newly programmed general purpose digital computer is a new machine and has new properties and is capable of performing new functions when later supplied with signals that represent data to be processed.

FN* White-Smith v. Apollo, 209 U.S. 1 (1907).

***5** Every invention, before it may be patented, must be novel and unobvious, in view of everything which has been done beforehand, that is, in view of all of the prior art. For new and improved machines, whether they be digital computers or the special purpose electronic computers which are created, or manufactured, when new programs are incorporated in them, each machine must be judged against the prior art. That art includes prior computers, prior computer programs, and prior programmed computers. Each new machine warrants patenting, if it passes muster on the criteria established by Congress in Title 35 of the U.S. Code.

This court in Gottschalk v. Benson, 409 U.S. 63 (1972), correctly held that the subject matter there presented was not properly claimed. That holding should not be expanded here to state that a programmed computer does not constitute statutory subject matter under 35 USC 101 and that it is not capable of being patented even if the other requirements of the patent statute are met.

The main focus of this case should be on whether a new machine is created by programming a computer in order to provide the structure to perform specified functions. Computer-related machines should not be classified as non-statutory subject matter unless Congress so requires. The present law includes no such artificial classification.

***6** V.

The Claimed "Machine System" Is a Machine Under 35 U.S.C. 101.

The claims presented in this case are detailed recitations of parts and means for performing specified functions. Claims may incorporate elements "... expressed as a means ... for performing a specified function with the recital of structure ..." 35 USC 112. As such, they should be considered to be the proper subject matter for a patent, in the field of computer technology just as they are in other fields, and the determination should then be made as to whether the claims meet the conditions for patentability.

Petitioner, however, asks this court to stop at the threshold question of whether the "machine system" is a machine. It is Petitioner's contention that the subject matter of the claims is not a machine at all, but an abstract intellectual concept not represented in a concrete form (Brief p. 21). The Petitioner refuses to recognize that apparatus claims written in means-plus-function form cover only the physical machine disclosed in a patent application and equivalents thereof. The principle that abstract ideas are not patentable is sound and well-established in the cases reviewed in Gottschalk v. Benson. But the principle has no application to this case.

Benson questioned whether the invention there presented was properly claimed as "a 'process' within the meaning of the Patent Act", 409 U.S. 63 (1972), and found that it was not properly claimed because the claims were too abstract under the

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guidelines of Supreme Court cases of the last century.

***7** The invention presented here is concrete and not abstract. Unlike Benson, the apparatus claimed here is not broad enough to cover a "scientific truth or mathematical expression of it". Mackay Radio & Telegraph Company, Inc. v. Radio Corporation of America, 306 U.S. 86, 94 (1939). Computer programs and computers may, if properly defined, be concrete and not simply mathematical formulae. They should be no more and no less patentable than any other inventions. There should be no special rules for programmed computers or programming of computers as opposed to other categories of inventions, just as there are no rules special to catalysts, enzymes, and the like.

The government criticizes the court below for elevating form above substance in limiting Benson to processes and distinguishing the present apparatus claims. Yet the government itself places form above substance in characterizing the invention here presented as an "idea", rather than an invention. An idea may be an invention and it may be patentable if it is concretely defined within the guidelines laid down by Congress in 35 USC 112. If the idea is not expressed in concrete terms, that is as an apparatus, process or the like, then it fails to meet 35 USC 101 or 35 USC 112. But here the invention is concretely defined as a machine. Whether or not the invention is patentable is a separate question. In any event, the invention is not merely an abstract idea.

The characterization of the invention as an idea tends to place programmed computers in a class by themselves, which is not Congress's stated intent. The patent laws that have been enacted by Congress require the evenhanded application of all applicable statutory ***8** provisions to the claims of the application presented here.

One of the enduring values of the patent system is that it has remained relatively unchanged since 1836. The Act of 1836 granted a patent "to anyone who may have discovered or invented any new and useful art, machine, manufacture or composition of matter." 5 Stat. 117, Sec. 6. This language is nearly identical to our present Section 101, except that today "process" is a more popular synonym than "art".

In Burr v. Duryee, 68 U.S. 531 (1863) the patent, to one Wells, was first issued with detailed claims about a hat-making machine illustrated at 68 U.S. 543. The claims are quoted at 68 U.S. 567. The Supreme Court noted that "the original patent of Wells has been more than once decided by the courts to be a valid patent ... He claims all he had a right to claim as new and no more" (68 U.S. 571). In short, the Wells patent met all of the criteria of the patent laws, including novelty and unobviousness.

The problem in the Burr case is that the original patent was reissued as separate patents for the machine and the process in 1856 and was again reissued in 1860, the second time claiming an invention as "... forming bats of fur fibres by throwing the fur in properly regulated quantities, substantially as herein described". (68 U.S. 568). The Supreme Court stated that this was an "expansion by an equivocal claim which may be construed a claim for the result or product of the machine, or for its principle or mode of operation". It was an "ingenious attempt by the assignee to expand it into an abstraction". (68 U.S. 568.)

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***9** This is the kind of problem that was involved in the old cases referring to "ideas" and "abstractions". Today we would say the claims are either non-statutory under Section 101 or indefinite under Section 112. Even though a specific machine is disclosed, the claims in Burr were by the time of the second reissue so indefinite as to constitute abstractions. But Burr also pointed out that a machine is not an idea as in a machine.

In contrast, the claims of the Johnston application describe the machine in almost infinite detail. It is inconceivable that claim 20 (Appendix, page 107) could be deemed a mere abstract idea. This claim shows that Respondent is not seeking a patent "... for a 'principle' or a 'mode of operation', or an idea, or any other abstraction", Burr v. Duryee, supra, but only a patent on a machine.

All inventions are based upon ideas. So far as 35 USC 101 is concerned, the sole question is whether the claims cover the idea per se or whether they are limited to the implementation of the idea.

The proper inquiry on patentability is whether the machine is new and non-obvious, not whether it is abstract or concrete. As the Court noted in Benson, "transformation and reduction of an article "to a different state or thing" is the clue to patentability of a process claim that does not include particular machines". It follows that the patent law is not frozen in old technologies, and that patents for machines involving programmed computers are not to be foreclosed.

Computer-related inventions have been patented for years and should not now be treated as sui generis in the absence of Congressional action.

***10** Even though an idea per se does not constitute statutory subject matter, inventions that are concrete expressions of ideas may be claimed as processes, machines, compositions of matter, or articles of manufacture, as the case may be. 35 USC 101.

So far as computer technology is concerned, inventions are often embodied in the programmed computer itself. The programmed computer may be claimed as a machine or apparatus. Machine claims that are based on a transformed computer are clearly within the ambit of the patent law, even if a program per se is not.

In O'Reilly v. Morse, 56 U.S. (15 HOW) 62 (1853) this court said:
"While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be." (Emphasis added).

A newly programmed general purpose computer which is unobvious, definitely claimed, and meets all other statutory tests, is just such a new and useful structure.

While it is true that in O'Reilly v. Morse, claim 8 was held to be invalid because it was too broad, other claims were held to be valid. Claim 5 is particularly important from the standpoint of the present case because there the invention was defined in terms of the meaning of a code.

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Robinson, in his Treatise on the Law of Patents, (1890) Vol. 1, page 259, defined "machine" as:

"... an instrument composed of one or more mechanical powers and capable when set in motion of producing by its own operation certain predetermined physical effects."

***11** It follows that since a programmed computer operates in a new way, it constitutes a new machine.

The Patent Office has long recognized that the relations between parts of a patentable claim may be expressed by means of mathematical formulas, Ex parte Avery, 41 USPQ 238 (Pat. Off. Board of Appeals, 1939); Ex parte Massa, 48 USPQ 331, 333 (Pat. Off. Board of Appeals, 1940). So also has this Court. (Mackay Radio & Telegraph Company, Inc. v. Radio Corporation of America, supra).

As early as 1942, the Patent Office issued a patent on an IBM card per se in which two additional rows of holes and non-holes were added. The Board held that the new arrangement of holes and non-holes constituted statutory subject matter, Ex parte Lang, 56 USPQ 423 (Pat. Off. Board of Appeals, 1942). These claims include limitations regarding how the holes in these two rows were related to holes elsewhere on the card in order to provide an interpretation of the latter holes. In effect, the relationship involved an unpatentable algorithm for ascertaining the meaning of the holes and the patent issued for the article (card), not for the algorithm per se.

In the last century, there was debate about the kinds of "process" that were contemplated in the Constitution by the term "useful art". Corning v. Burton, 56 U.S. (15 HOW) 252 (1853) concluded that processes "... where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another" are within the scope of the patent laws, notwithstanding the failure of the Patent Act of 1836 to make a process, eo nomine, the subject matter of a patent. This ***12** definition of process was expanded to include "... an act, or a series of acts, performed upon the subject matter to be transformed or reduced to a different state or thing." in Cochran v. Deener, 94 U.S. 780 (1876). By 1880, this court could state without hesitation: "That a patent can be granted for a process, there can be no doubt." Tilghman v. Proctor, 102 U.S. 707 (1880).

One would have thought the matter settled nearly a century ago, but Petitioner and the CBEMA seek to set aside the field of computers and computer programs as sui generis and not subject to the normal rules of the patent laws enacted by Congress. Whether it is claimed as a process, as in Benson, or as apparatus, as here, the invention should be measured for its intrinsic worth under the statutory guidelines as interpreted by this court, notably in Graham v. John Deere, 383 U.S. 1 (1966).

The Petitioner and Computer and Business Equipment Manufacturers Association both rely heavily upon the analogy of computer programs on a piano roll. We believe that this analogy is inapposite.

In its application to the facts of this case, White-Smith v. Apollo, supra is no different than O'Reilly v. Morse, supra, Burr v. Duryee, supra, or any of the other cases dealing with the dichotomy of abstract idea versus concrete expression. White-Smith held that a piano roll is not a copy of a copyrighted sheet of music in the

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sense of the copyright statute. This Court said that a statutory copyright does not extend to every means of expression of the order of notes in a melody. 209 U.S. at 11. A copy of a musical composition must be "... a written or printed record of it in intelligible ***13** notation" (209 U.S. at 17). The argument was rejected that copyright is intended to protect the melody itself and all means of expression of the order of notes which the composer has invented (209 U.S. at 11). Stated another way, the form of expression as sheet music is protected by copyright, but another form of expression of the abstract idea (piano roll) is outside the scope of the copyright, even though the abstract idea in the melody is the same.

This philosophy is well grounded in copyright law, and has been recently expressed in Goldstein v. California, 412 U.S. 546 (1973). There a different means of expression of the same abstract idea (tape) was held to be outside the scope of the copyright statute so that the states were free to regulate trade in that form of expression, even though the abstract idea recorded on the tape was the same. Tape reproduction was held to be potentially a "writing", but Congress had not yet acted when the facts of the case arose.

But this case differs from White-Smith and Goldstein because Congress has already stated the criteria for patentability in Title 35. This case is not a question of new technology having outpaced the scope of the patent laws, as the Goldstein case involved technology that outpaced the copyright law. Here it is simply a question of whether the machine claimed is within the statutory classes defined in 35 USC 101 and meets the tests of 35 USC 102, 103 and 112.

In White-Smith this Court pointed out that a piano roll is a mechanical device. From this it follows that a punched tape or the like may form the basis of a patentable combination.

The admonition of White-Smith that "The statute has not provided for the protection of the intellectual ***14** conception apart from the thing produced, however meritorious such conception may be ..." (209 U.S. at 17) does not apply in this case because the claims relate to "the thing produced", not merely the conception.

The machine of the present application is still a machine, even though it is computer related. It is not a mere idea simply because a computer may be involved.

VI.

Programming a Computer Changes It to a New Machine.

When a program is fed to a programmable computer, the states of various elements in the computer are transformed. If the program is new, then the pattern of states of the various elements is new. The computer with its elements transformed to those new states is a new computer with its parts interrelated in a way that never existed before. Of course, it is another question whether the new computer is worthy of a patent. Nevertheless, it is a new machine.

The states of the various parts of a computer that has been programmed are far less elusive than the states of the elements or groups of elements in a new chemical compound. That pattern determines the functions of the computer.

Programming of machines has been accomplished with the aid of numerous programming

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devices, such as levers, dials, cams, punched tapes, and punch cards since long prior to the year 1800.

Though algorithmic computers have been manufactured in increasing numbers since the Sixteenth Century, one was made at least as early as about 1000 A.D., and replaceable punched-card programs have been widely understood since at least as early as 1834 (See Appendix A attached hereto).

***15** Programs have long been stored in metal parts by cutting them to desired shapes, in tapes or cards by punching them with coded patterns of holes, and in the memory elements of a general purpose digital computer by changing their states. Just because technology has now grown up to the point where levers and cams have given way to punched cards and memory elements as parts of machines, is no reason to change the patent laws and to penalize inventors who make use of modern technology instead of just the old technology.

A programmable computer is not wholly dissimilar to other kinds of inventions. For example, certain reagents, such as catalysts, may be known and old in themselves, yet in combination with other material produce surprising "non-obvious" results. A catalyst is, by definition, the same at the end of a chemical process as it was at the start. Yet it is capable of greatly simplifying the burden of arriving at the production of a desired product. Economic and technical advantages are part of the measuring stick to determine whether a patent should be granted. A catalyst may be used in a new reaction, even if the catalyst is old, and still the reaction will be (possibily) worthy of patent protection.

The effect of the new structure created by programming the computer is far different from merely feeding a new series of numbers to an old calculator, such as an abacus or Pascal's adding machine, to process the new numbers fed into it in the same old way.

The language of 35 USC 101 fits a programmed computer perfectly, if it is new and useful. The statute says that a person is not only entitled to a patent on a machine, but also to an improvement of it thereto. A programmed computer accomplishes more than an unprogrammed ***16** computer and is therefore certainly "an improvement of an unprogrammed computer", and hence is at least an improved machine.

Though algorithms per se do not constitute statutory subject matter under 35 USC 101, all processes and machines that are implemented with the aid of algorithms, should be recognized as constituting statutory subject matter.

When a program acts upon a programmable computer to change it to a new machine which performs new functions, this constitutes statutory subject matter under 35 USC 101 and is patentable if the invention meets the requirements of 35 USC 102 and 103, and the claims conform to 35 USC 112.

In his reply brief on the Petition for Writ of Certiorari, the Petitioner has admitted at page 2, the possibility of patentability

1. If a program coacts with an ordinary computer in a synergistic way, OR
2. If the program is carried out with newly invented apparatus, OR
3. If a program produces a new use for an old machine sufficiently inventive to be

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patentable as a process.
Possibility of patentability necessarily implies that the subject matters in all three categories are statutory under 35 USC 101, even if they are not patentable under 35 USC 102 and 103.

Johnston's claims define a new machine in accordance with the provisions of 35 USC 112, unlike those of Benson. These claims define subject that matter falls both in categories 1 and 2 above, which the Petitioner ***17** admits constitutes potentially patentable subject matter and hence even if not patentable, constitute statutory subject matter.

It makes no difference whether the machine that is programmed is a loom, a radio receiver, a printing press, an automobile factory, a power plant, a set of traffic lights at an intersection of two boulevards, or a computer. And it makes no difference whether the programming is done with gears, cams, or punched cards, or whether electrical or magnetic or some other natural force is used. Congress has not excluded any of those kinds of devices or programming systems from the field of statutory subject matter.

Congress has declined to contract the patent laws to exclude programmed computers from statutory subject matter in the face of the recommendations of the President's Commission (Report of the President's Commission on the Patent System, November 17, 1966).

The Commission had recommended that
"The classes of patentable subject matter shall continue as at present, except:
...
"3. A series of instructions which control or condition the operation of a data processing machine, generally referred to as a 'program', shall not be considered patentable regardless of whether the program is claimed as: (1) an article, (b) a process described in terms of the operations performed by a machine pursuant to a program, or (c) one or more machine configurations established by a program." (Emphasis added).
***18** This recommendation, if enacted, was intended by its sponsors, to change the law so as to exclude from the field of statutory subject matter, inventions of the kind defined by the Johnston claims. Congress has persistently ignored that recommendation. Though Congress has considered many patent "reform" bills since that time, none of them has even included any provision for excluding computer programs from the field of statutory subject matter.

The Constitution places no restriction on what inventions are patentable. Congress has defined the classes of inventions that may be patentable in very broad terms and has not excluded programming of computers and programmed computers as patentable subject matter, and said inventions are patentable so long as the claims meet the requirements of 35 USC 102, 103, and 112.

The Petitioner should not be permitted to change the law indirectly by repeated petitions to this Court in a way that the President's Commission has failed to bring about directly by its appeal to Congress. Legislation to give special treatment to any segment of industry, such as manufacturers of general purpose digital computers and to deprive other segments, such as manufacturers of software, of patent rewards

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for their creations, should not be judicially mandated. If there is to be such special interest legislation, it should be left to Congress.

***19** VII.

Conclusion.

For the above reasons, Amicus urges this Court to clarify Gottschalk v. Benson and particularly to hold that a newly programmed general purpose digital computer may be a new machine that constitutes statutory subject matter under 35 USC 101.

***1a** APPENDIX A.

History of Algorithms, Digital Computers, and Programs.

This short history has been gleaned primarily from the works cited in the attached bibliography.

Our discussion is limited to digital computers, that is, to computers in which numbers are changed by discrete amounts, such as 1, or 2, or 3, etc. or multiples thereof. Almost all mechanical digital computers, e.g., adding machines, operate on the decimal digital system. Almost all electronic digital computers operate on the basis of the binary system. Both kinds commonly carry out calculations or other operations automatically in accordance with algorithms [FN1] that have been programmed into them. The programming may be incorporated in arrangements of gears, cams, punched tapes, punched cards, magnetic tapes, plugs and sockets, or wiring and solder joints. The day will come when the programming will be performed directly by action of the human voice on the computer.

> FN1. The term algorithm usually refers to a series of mathematical steps for solving a problem of a particular type. It also sometimes refers to a series of steps employed to carry out other processes. More modernly though, the term algorithm has also come to mean a computer program. The term algorithm is used in this appendix only in the first sense.

Algorithms for performing operations of addition, subtraction, multiplication, and division have their origin in prehistoric times. It was in the Tigris-Euphrates valley, before about 3000 B.C., that a simple device was developed to facilitate carrying out algorithms manually. It was called the abacus. This device is still in common use in the Orient and in Eastern Europe. The abacus has long employed extra beads to enable the user to apply the 5-carry algorithm and the 10-carry ***2a** algorithm. Algorithms for solving complex problems in arithmetic were employed in Babylon in ancient times, but so far as we know, without any machinery (Knuth).

The idea for mechanizing the algorithms of the abacus occurred to the Moors before the year 1000. Early attempts at mechanization of computation were made by Gerbert of Autillac (later Pope Sylvester II from 999 to 1003), and Magnus. (Rosenberg, pages 20-21) Even Leonardo da Vinci had a hand in the subject in the 15th Century. (Rosenberg, page 21) And then:

"The 16th Century ... marks the decline of the abacus in Europe in favor of algorithmic methods of calculation." (Hawkes, page 9.)

Many calculators soon appeared for carrying out the algorithms of adding, subtracting, multiplying, and dividing mechanically (Schickard, 1632; Pascal, 1645; Morland, 1666; Leibnitz, 1694, and others). The first calculator that was programmed

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to enable its user to crank out a series of answers was that of Poleni (1709). Halacy calls Poleni's efforts the first attempt at programming a computer [Halacy, page 44].

Punched tapes and punched cards have been used to program the operations of a loom since before 1730 [Halacy, page 88 and Rosenberg, page 107.] Jacquard automated such looms in about 1804.

In the 19th Century. Charles Babbage, a banker's son and mathematician, designed two "general purpose" digital computers. They were general in different degrees. One was called the "difference engine", the other was called the "analytical engine". Several different persons constructed Difference Engines and put them into practical use (Babbage, Scheutz, Grant, ***3a** Deacon). Figure 1 illustrates some of the features of the Difference Engine and one of its "printouts" [from Eames, page 29].

With respect to Babbage's Difference Engine, Lardner wrote, in 1834, in patent-judicial language, after discussing prior work of others:

> Even had the mechanism of these [earlier] machines performed all which their inventors [Pascal et al.] expected from them, they would have been still all together inapplicable for the purpose to which it is proposed that the calculating machinery of Mr. Babbage shall be applied. They were all constructed with a view to perform particular arithmetical operations, and in all of them the accuracy of the result depended more or less upon manipulation. The principle of the calculating machinery of Mr. Babbage is perfectly general [FN2] in its nature, not depending on any particular arithmetical operation, and is equally applicable to numerical tables of every kind." (Emphasis and bracketed portions added.) [Morrison, page 219.]

> FN2. Babbage's "Analytical Engine", conceived later, was even more general. What is general today may be considered special tomorrow.

In 1833 Babbage conceived and commenced the design of his Analytical Engine. His plan for the Analytical Engine is shown in Figure 2 with a few legends added. The drawing is dated August 6, 1840 [Morrison, pp. 378-379].

The Analytical Engine was to be employed for solving almost any kind of algebraic equation and was even designed to solve simultaneous equations, depending upon how it was programmed. Each program was to be ***4a** embodied in a pair of decks of punched cards (see upper part of Figure 2) and was to operate on a set of numbers represented by a set of cards that we now call a data deck (see lower right of Figure 2). (Punched cards devised by Babbage are shown by Eames at page 12, and Hawkes at page 23.)

A program for solving a particular algebraic problem x ?? (ab + c)d is represented in Figure 3. [FN3] This program was published by Babbage's son in 1888 [Morrison, p. 334]. As used in Figure 3 the term "column" refers to a stack of rotating gears and number wheels in which data is stored. The term column does not refer to a column on a piece of paper. In Figure 3, the first two sections identify the cards in the deck that were to form part of the machine for solving the problem. The third section describes the functions or operations performed by coaction of the cards with the rest of the machine. This same program could be used to solve the equations E ?? MC^2 and A??R^2.

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FN3. The term "program" is often employed to refer to the list of instructions, such as those set forth in Fig. 3. Sometimes the term refers to a deck of punched cards or a punched tape or the like, or other device which coacts with the computer to cause the computer to carry out a series of steps to perform a predetermined calculation that may be desired or, more modernly, to send signals to various kinds of equipment, such as a printing press or a drill press, or a space vehicle, to cause them to act in some required manner.

Each algorithm was to be embodied in a different pair of program decks. And each pair of decks could be removed and replaced by another. A library of program decks could be built up. Similarly for the data decks.

Babbage's Analytical Engine included three principal parts, a store (memory unit) and a mill (an arithmetic-algorithm performing unit) and a control unit, including ***5a** the program cards and other components for controlling the interaction of the store, the mill, and peripheral devices, such as a printing press.

The "mill" of a general purpose digital computer includes standard components arranged to perform certain simple functions, such as adding, subtracting, multiplying, and dividing.

The "store" receives, or holds, data signals. Today it also usually holds the program.

The nature and function of the control unit is determined by the program that has been stored in it. It controls the feeding of raw data (analogous to grains of wheat, etc.) to the mill, the exact nature and sequencing of the processing that occurs in the mill, and the allocation of the output of the mill to various parts of the output store or elsewhere.

The Analytical Engine designed by Charles Babbage became a reality in the period 1937 to 1944 under the leadership of Howard H. Aiken at Harvard University with the support of IBM and the Office of Naval Research. MARK I, also known as the IBM Automatic Sequence Controlled Calculator, embodied the principles of the general purpose digital computer described by Charles Babbage but employed electromagnetic relays and other electrical circuitry in place of many of the mechanical elements.

Figure 4 shows part of the MARK I including one of the punched tapes in which a program was stored (Aiken, Plate VI opposite page 14). Though this 2000 pound computer was the only one of its kind, it was so well known that it was necessary to publish a 561-page volume to describe its operations and the method of programming [Aiken, Preface].

***6a** As indicated in Figures 2 and 4, punched cards and punched tapes are devices in which programs are stored. In more modern computers, the programs are stored in memory units which include memory elements that have states that have been transformed by programming.

More modernly the programs are frequently first stored on a punched tape or a deck of punched cards or on a magnetic tape and then through a translation process that

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normally includes "compilation" and "assembly," the program is translated into a pattern of states which is stored in the memory elements of a memory unit that forms part of the computer. But just as a deck of punched cards or punched tape forms part of a computer, so also now the programmed memory unit with its changed states forms part of the computer.

Though Babbage's calculator has been likened to a flour mill (see Fig. 5 from Murphy, Vol. 1, page 77), it is really far more because it has many millstones and other devices which are controlled by a program deck to perform operations on input in new sequences to produce new kinds of results.

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***9a** FIGURE 1.

***11a** III

GENERAL PLAN OF ENGINE No. 1

***13a** FIGURE 3.

Directive Card	Operation Card	--
1st	...	Places a on column 1 of Store
2nd	...	Places b on column 2 of Store
3rd	...	Places c on column 3 of Store
4th	...	Places d on column 4 of Store
5th	...	Brings a from Store to Mill
6th	...	Brings b from Store to Mill
...	1	Multiplies a and b=p
7th	...	Takes p to column 5 of Store where it is kept for use and record
8th	...	Brings p into Mill

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9th	...	Brings c into Mill
...	2	Adds p and c=q
10th	...	Takes q to column 6 of Store
11th	...	Brings d into Mill
12th	...	Brings q into Mill
...	3	Multiplies dxq=p_2
13th	...	Takes p_2 to column 7 of Store
14th	...	Takes p_2 to printing or stereo-moulding apparatus

***15a** FIGURE 4.
***17a** FIGURE 5.

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For opinion see 96 S.Ct. 1393

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals.

Brief Amicus Curiae for Software Associates, Inc.

Reed C. Lawlor, 412 West Sixth Street, Los Angeles, Calif. 90014, Attorney for Amicus Curiae.

Of Counsel: Leonard Tachner, 412 West Sixth Street, Los Angeles, Calif. 90014.

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***1** I.

The Question.

Whether an invention is unpatentable under 35 USC 101 merely because it has been implemented by programming a modern general purpose digital computer.

II.

Consent.

Software Associates, Inc. has received consent from both parties to file this brief amicus curiae. The letters of consent have been filed with the Clerk of the Court.

***2** III.

Interest of Software Associates, Inc.

This Amicus, Software Associates, Inc., is a small corporation located in Altadena, California and engaged in the manufacture of software for a wide variety of customers. Amicus believes that it is typical of thousands of other small companies engaged in software manufacture.

Amicus has no interest in Johnston's patent application and does not consider itself prepared to form a judgment as to whether or not the invention described and claimed there is unobvious over the prior art.

However, Amicus believes that it is qualified to discuss the general proposition as to whether a programmed computer is a different machine from an unprogrammed computer and strongly opposes the Petitioner's position with respect to the first two questions set forth by Petitioner at page 2 of his brief.

Because of the uncertain status of the patent law, at least as it appears to the software industry, Amicus has not sought to protect any of its products under the patent laws. Discouraged, Amicus, like many other similar companies, has sought to

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rely upon the law of trade secrets and the law of contracts in order to protect whatever proprietary rights that it has.

Amicus is familiar with the benefits that small companies derive from the United States patent laws in other fields. By obtaining patents on their inventions, small companies in other industries are given an opportunity to grow, and sometimes do succeed in growing. Amicus believes that companies engaged in software development deserve to benefit from the patent laws to ***3** the same extent as companies in other industries when they make meritorious inventions.

Amicus is familiar with Gottschalk v. Benson, 409 U.S. 63 (1972) and is also familiar with many of the practices of the United States Patent Office. Amicus is confused by Gottschalk v. Benson, supra, and is dismayed by the prospective costs and difficulties of obtaining a patent on an invention that is implemented by software programming and especially by the prospects that a patent may not be obtained at all without resort to an expensive appeal proceeding.

Amicus recognizes that implementation of most programs does not involve patentable invention. But Amicus also believes that the implementation of many inventions that are based upon programming, whether it be by software programming or hardware programming, are meritorious and deserving of patent protection.

IV. Summary of Argument.

Amicus, Software Associates, Inc. urges this Court to recognize that programming of computers either by software methods or by hardware methods, constitutes patentable subject matter under 35 USC 101 and that patents should be granted on the basis of inventions implemented by programming of computers, so long as the requirements of 35 USC 102, 103, and 112 are satisfied.

Software programing of a programmable computer transforms it to a new machine that functions differently from either the program alone or the unprogrammed computer alone. The changes in the machine resulting from programming can be detected in various ways.

***4** One general purpose digital computer can even be software-programmed to function like another general purpose computer. Such programming is called "simulation." This fact demonstrates not only that a software-programmed computer is a different machine from an unprogrammed computer, but also that hardware programming and software programming are equivalents.

Simulation is often employed in the early development of a new general purpose computer before it has been built. The function of a new general purpose digital computer is the same regardless of whether it has been constructed by hard wiring or constructed by simulation. The invention is the same in either case. Under 35 US 103, patentability of an invention does not depend on how it has been made. Hence, a machine is statutory subject matter regardless of whether software programming or hardware programming is used in its construction.

V.
Comparison of Software Programming and Hardware Programming.

The analysis presented here will be aided by some familiarity with the similarities

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of and the differences between hardware and software programming.

Broadly, in computer technology, the term software program often refers to a series of instructions which are written in numerical form or in alphabetical form. These instructions are then stored in a program, such as a deck of punched cards, and then transferred from the cards to the memory unit of the computer where the program is stored on a temporary, or semi-permanent, basis. On the other hand, when the program is ***5** stored in the memory unit by hardware programming, such as by soldering of wires, the program usually remains stored on a permanent basis.

In modern general purpose digital computers, the memory unit frequently consists of magnetic cores, or rings, through which wires are threaded. To simplify the discussion, we will usually assume that we are dealing with a memory unit in which the various cells consist of magnetic cores which can be magnetized in one direction or in the opposite direction around the core.

A program may also be stored in a paper tape by punching holes in it, or in a magnetic tape by magnetizing successive parts of the tape in different ways to represent holes and non-holes. In any event, the programmed device is fed to a card reader or tape reader. As successive parts of the programmed device are fed into the reader, electric signals are created in accordance with the marks or holes in the cards or tape in order to set the magnetization of the cores in one direction or the other, thus storing the program in the computer. In such a storage process, the changes in magnetization in effect operate to change the interconnections between the various wires in order to permit the flow of current in one direction or to prevent the flow of current in that direction. Various sections of the magnetic memory unit, not necessarily physically contiguous with each other, operate together to bring about certain associated operations. Such sections of the memory unit act as controls to perform different functions.

Software programming and hardware programming are often equivalent and one may be employed in place of the other for many different purposes.

***6** It is to be noted that Johnston's application describes his invention as being embodied in a computer that has been transformed in accordance with his program. But Johnston's claims do not specify a program. They specify only the machine formed by programming in terms of means plus functions, as authorized by 35 USC 112.

VI.
A Programmed Computer Constitutes Statutory Subject Matter.

When a program is stored in a general purpose digital computer, the states of various memory elements in the computer are transformed. If the program is new, the pattern of states is new, thus creating a new machine that performs new functions.

New machines constitute statutory subject matter (35 USC 101) regardless of how they are made (35 USC 103).

While the Petitioner, the Commissioner of Patents and Trademarks, recognizes that a new machine constitutes statutory matter (Pet. Br. [FN*] p. 11), he urges that programming a general purpose computer does not create a new machine (Pet. Br. pp. 29-38). Case after case has held that programming of a general purpose digital

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computer creates a new machine. Ex parte King and Barton, 146 USPQ 590, 591 (Patent Office Board of Appeals, 1960), In re Prater and Wei, 415 F.2d 1393, 1405 (CCPA, 1969), In re Bernhart and Fetter, ***7** 417 F.2d 1395, 1400 (CCPA, 1969), In re Comstock and Gilmer, 481 F.2d 905, 909 (CCPA, 1973). In spite of this long-standing recognition that a programmed general purpose digital computer constitutes a different machine from the unprogrammed computer, the Petitioner now contends the contrary (Pet. Br. p. 12), but supplies no evidence to support his contention.

> FN* The following abbreviations are employed in this brief: "Pet. Br." refers to brief of the Petitioner; "A" refers to the Appendix; "CBEMA" refers to the Computer and Business Equipment Manufacturers Association; "CBEMA Br." refers to the brief of the CBEMA: "Tr. Oral Hearing" refers to the oral hearing held on October 16, 1972 in Gottschalk v. Benson, supra.

Because of Petitioner's contention, it is necessary to discuss the issue as to whether a programmed computer constitutes a new machine, without an opportunity to take evidence on the question. The Petitioner has given no proof that a programmed computer is not a new machine. Amicus will attempt to persuade the Court that it is, by reference to evidence that is available to the Court.

When the memory unit of the computer includes magnetic cores interlinked by wires, feeding a new program into the computer, in effect, causes the wires to be interconnected in a new way. After a new program has been stored in such a computer by setting the magnetization of the cores, the various parts of the computer are then in a new set of conditions. As a consequence, they coact or function in a new way, so as to produce new results. While some parts of the computer continue to operate as they did before, by adding, subtracting, or performing other preset functions, the programming of the computer changes other parts to create new controls, so that new sequences of operations and other actions occur. New signals are created because of the new interactions. The Petitioner overlooks those new interactions (See for example, Pet. Br. pp. 16-17). And it is these new interactions that makes the programmed computer a new combination of parts with new controls, as distinguished from an aggregation ***8** that does nothing new. Graham v. John Deere Co., 383 U.S. 1 (1966). Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147 (1950).

Though a programmed general purpose digital computer looks the same as an unprogrammed general purpose digital computer, after being programmed it is not the same, and it no longer functions merely in the same old way. Its new functions constitute evidence that it is a new machine. There are numerous ways that a person can satisfy himself that a programmed computer has been transformed into a new machine by the program fed into it.

One way is to reflect on what the program can do without the computer and what the computer can do without the program. We will reflect below with reference to the action of Johnston's program in relationship to the IBM 1400 to which Johnston's program has been applied in his description.

1. First, consider a program that is represented by a deck of punched cards. Without a computer it is useless for its purpose. The program deck will not calculate.
2. Now consider the 1400. Unprogrammed, it will produce no useful result at all,

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no matter how many times you push its START button. Until it has been changed by implementation of Johnston's program in it, it will not produce a result for which the program was designed.

3. Now let's program the computer by feeding Johnston's program deck into it. During the feeding operation, the computer takes the cards from the deck, one at a time, and transforms ***9** the patterns of holes on the cards into a new pattern of states of magnetic cores (or other memory elements) of the memory unit of the computer, to store a magnetic or electrical counter part of the program. The cards are not consumed, but remain intact for later reuse.

It is only after the 1400 has been transformed by storing Johnston's program in its memory unit that it is capable of being operated to achieve Johnston's results.

4. Now let's feed records of customer data into the programmed computer as taught by Johnston, and push the START button. This time Johnston's new results are produced. The records are processed automatically in accordance with the procedures carried out in the action of the new controls created by Johnston's program. After the computer has been programmed as taught by Johnston, it remains altered indefinitely (so long as Johnston's stored program is not removed), so that it can continue to achieve Johnston's results each time new data is fed to it.

The reason that the 1400 produces Johnston's new results when it has been programmed by Johnston, is that the machine has been changed to function in a new way. Thus it is clear that the programmed machine is different from the unprogrammed machine, and is indeed a new machine.

Still another way to test a programmed general purpose computer to ascertain that it is indeed a new machine, is to make tests of standard kinds to determine what the states are of the various parts of the computer after it has been programmed.

***10** The states of the memory elements of the programmed computer can actually be pictured by a process known as a "DUMP". [FN1] Such a process involves electrically triggering the memory elements to create a stream of signals that represents the states of the memory elements and using that stream of signals to print numbers representative of those states on a strip of paper. These numbers provide the operator of the machine with a "picture" or "snapshot" of the pattern of states. A succession of "snapshot" DUMPS can even be made while the computer is operating in a "slow motion" mode.

FN1. IBM System/360 Operating System, FORTRAN IV (G and H) Programmer's Guide, Form C28-6817-0, pp. 80-81 (IBM, 1968).

A skilled programmer can read a succession of such snapshots, to ascertain the new physical interrelations that have been created by the program between various parts of the computer and their reactions to the input signals and to each other to produce output signals.

From the foregoing explanation, it is clear that (1) the action of a new program on a computer is synergistic and that a new machine is created by that synergism, (2) the interdependence between the modified parts of the resultant machine is also synergistic, and the coaction is different from that which existed before, and (3) the results may also be synergistic.

Still another way of recognizing that programming an unprogrammed computer creates

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a different machine, is set forth in the next section.

The Petitioner and the CBEMA have attempted to belittle the programming of a general purpose digital ***11** computer by comparing it unfavorably to the playing of a piano roll in a player piano and similar reproducing devices (Pet. Br. pp. 16, 35, CBEMA Br, p. 6). The comparison is incomplete and neglects the differences. We will consider the player piano comparison.

To emphasize the difference between a reproducing player piano that plays a perforated piano roll and a programmable general purpose digital computer, we will consider a general purpose digital computer that is programmed by means of two punched tapes, one that bears holes that represent the program and the other that bears holes that represents data.

A player piano, indeed, produces sounds at its output corresponding to the holes on punched roll, line for line. But that is not what is done by a programmed general purpose digital computer.

The computer is altered semi-permanently by feeding in signals corresponding to the holes in the program tape. Then signals corresponding to data are fed in from another punched tape or otherwise. And then the programmed computer manipulates the data signals in a manner controlled by the programmed computer to produce an output which is far different from any line-by-line reproduction of the input data.

A player piano is designed to reproduce as precisely as possible the music played by a musician. [FN2] The less deviation there is from the original, in the reproduction by the player piano, the better the player piano is considered. The very nature of the action of the player piano remains the same from roll to roll.

FN2. Roehl, Harry N., "Player Piano Treasury", pp. 46-81 (Vestal Press, 1961).

A player piano is merely a reproducing machine with one fixed rule of action. That rule of action is ***12** not changed by reading the punched roll. A programmed computer is a signal processing machine in which the rule of action depends upon how the computer has been programmed, so that data later supplied from a punched tape or the like is processed differently according to the nature of the controls for which the computer has been programmed.

With Johnston's programmed computer, unlike with a player piano, the output is not a reproduction of the input data, but is a new composition generated by the computer to meet the requirements of the customer who supplied the data. If different customers supply the same data, the reports generated will be different when the customer requirements are different.

At page 5 of its brief, the CBEMA seeks to distinguish between application programs and system programs. The CBEMA has not explained the difference satisfactorily. The main difference seems to be that "system programs" are normally developed by computer manufacturers, whereas application programs are generally created by others. The CBEMA seeks one patentability standard for application programs and another for system programs.

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All programs that alter a memory unit of a general purpose computer to control it to achieve new results, affect the interaction of the parts. All such programs alter the computer so that it achieves new results. So there is no real dichotomy between system programs and the application programs.

Petitioner says that the patentability of inventions based on system programs is not at issue in this case (Pet. Br. p. 16). But the questions 1 and 2 that he presents to be decided at page 2 of his brief are not ***13** limited to only one kind of program. The Patent Act draws no distinction between such programs. None is deducible from it, and there is no clear semantic difference between all system programs and all application programs. It follows that a computer that has been transformed by a program, constitutes a new machine regardless of whether it involves a "system program" or an "application program". And Johnston's invention relates to a system (Pet. Br. p. 6, and lines 1, 2, 5 and 27 of his claim 20 (A., p. 107)).

That a programmed computer is a different machine from an unprogrammed computer is no legal fiction. And two differently programmed computers are different machines. And as we will see, one general purpose digital computer can be software programmed to function like another even though their hardware is different.

VII.

Software Inventions and Hardware Inventions Are Equally Patentable.

In this section, Amicus desires to call the Court's attention to some well-established principles of computer technology that go under the names of "simulation" and "emulation". These words are terms of art that have special meanings in the field of computer technology, somewhat different from their dictionary meanings. The essence of both "simulation" and "emulation" is that one general purpose digital computer may be so altered by programming that it functions like a different general purpose digital computer. Both "simulation" and "emulation" involve the use of software programming in which programs are stored in memory units by transformation of the states of the various cells in those ***14** memory units. On the other hand, emulation also makes use of some additional physical components.

Under 35 USC 103, patentability is not to be negatived by the manner in which an invention is made. It therefore follows that if a new machine is created by software programming it is just as patentable as if it were made by hardware programming.

Since a new general purpose digital computer that has been hardware programmed constitutes statutory subject matter, Amicus urges that if a new general purpose digital computer has been made by software programming, it is also statutory subject matter. And that therefore, all programmed general purpose digital computers constitute statutory subject matter.

Let us explain more fully.

One old general purpose computer, known as a host computer, can be software programmed to function like a different old general purpose computer, called a target, or simulated, computer. When a target computer has been simulated on a host computer, the simulation is known as a "virtual" computer. The virtual computer can then execute user's programs and data in the same way as the target computer and can

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then produce the same results as the target computer. [FN3]

FN3. Knuth, Donald, The Art of Computer Programming, Vol. 1, page 199 (Addison Wesley, 1968). Chu, Yoahan, Introduction to Computer Organization, page 170 (Prentice Hall, 1970). Katzan, Harry, Jr., "Computer Organization and the System/370", Computer Science Series, pages 264-265 (Van Nostrand Reinhold Co., 1971). Parmelee, R. P., et al., "Virtual Storage and Virtual Machine Concepts", pp. 99-130, IBM Systems J, Vol. II, No. 2, 1972).

***15** It is not only possible to simulate an existing target computer on a host computer, it is even possible to simulate on a host computer, a newly invented computer that has not yet been actually built by being wired and bolted together, and made ready for use. [FN4] Professor Knuth has pointed out that it is usually advantageous for a computer manufacturer to simulate a new machine before it has been built, so that software for the new machine may be developed (on the virtual machine) as soon as possible. [FN5]

FN4. Chu, supra; Knuth, supra, Katzan, supra.

FN5. Knuth, p. 199.

It is also possible to simulate several different target computers on the same host general purpose computer at the same time. In this case, users who have programs that were designed to run only on different target machines can run their programs simultaneously on the two virtual machines that they both "see" concurrently embodied in the same host machine. [FN6]

FN6. Parmelee, et al., supra.

Since a host general purpose digital computer can be programmed to function like a target general purpose digital computer, it follows that the resultant virtual computer is equivalent to the unprogrammed simulated target computer. Though the virtual computer may be slower in operation than the target computer, the loss of speed is often far outweighed by the saving in the cost of building or buying the target computer.

The equivalence between hardware programming and software programming also becomes readily apparent by ***16** considering how an old, host general purpose computer can be restructured to function like a new, target general purpose computer. In order to achieve a restructuring of the old computer to function like the new, three general methods are available, namely:

1. Rewiring the old general purpose digital computer.
2. Programming the old general purpose digital computer to simulate the new general purpose digital computer.
3. Emulating the new general purpose digital computer.

Both simulation and emulation involve software programming; but as previously mentioned, emulation also involves the addition of auxiliary electro-mechanical components. [FN7]

FN7. Katzan, supra; Parmelee, et al., supra.

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Of course, to design and develop a new general purpose computer, it is not necessary to construct the new computer in its entirety by programming an old computer. It may be sufficient in many cases merely to simulate some of the important subcombinations of the elements that are to form the new computer. [FN8]

FN8. Chu, supra.

In any event, when one computer is restructured by rewiring, simulation, or emulation, the modified host computer then functions like the target computer (except possibly for speed of operation). Since the restructured computer functions like the target computer in each case, they are equivalent. It follows therefore, under 35 USC 112, that the target computer is covered by the claims of a properly written patent on the target computer regardless of how the restructuring is accomplished. Infringement would exist regardless of whether ***17** the restructuring is accomplished entirely by rewiring or entirely by software programming or partly by each. If this were not so, patents based upon the disclosure of a hardware implementation "would be of little worth". Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405, 418 (1908). Graver Tank & Mfg. Co., Inc., et al. v. The Linde Air Products Company, 339 U.S. 605 (1950).

By the same token, an invention that has been made by means of software programming should be patentable on the basis of a disclosure of the software implementation and the patent thereon should cover equivalent hardware.

The fact that one general purpose computer can be constructed by simulation on another computer, can only mean that inventions that have been implemented by software programming are patentable just as are inventions that have been implemented by hardware programming.

Furthermore, if, as the Petitioner sometimes urges in many places (see for example, Pet. Br. pp. 29-38), software programming cannot form the basis of a patentable invention as a machine, then neither can hardware, if that hardware is capable of being simulated by equivalent software. And no one urges that patents may not be based on hardware implementations of programs. It follows therefore that patents may be based on software implementations of programs.

Under 35 USC 112, it is only necessary for an Applicant for patent to describe the best mode contemplated by him at the time for carrying out his invention. It is not necessary to describe any other mode. Continental Paper Bag v. Eastern Paper Bag Co., 210 U.S. 405 at 418-420 (1908). Tilghman v. Proctor, 102 ***18** U.S. 707 at 726 (1880). Chicago Pneumatic Tool Co. v. Hughes Tool Co., 97 F.2d 945 (CA 10, 1938) cert. den. In re Gay, 135 USPQ 311 (CCPA, 1962). In re Brebner, 173 USPQ 169 (CCPA, 1972). Accordingly, if an invention is capable of being implemented in both software form and in hardware form, a disclosure of either is sufficient to form a basis for claims that cover both.

Very frequently, software programming of a general purpose digital computer to implement an invention represents the best mode of practicing the invention. This occurs, for example, where it would be too expensive or time-consuming or both, to build a completely new computer by wiring and bolting. It also may represent the best mode where it is desirable to practice the invention at many different

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locations, but for only short times at each. By software programming, the investment of time and money for achieving the desired results may be greatly reduced and the invention made available more readily and quickly to members of the public. An applicant should be entitled to "means plus functions" claims under 35 USC 112 even if he discloses implementation of his program by software methods. The law requires him to disclose his software methods if that is his best mode. And he should not be punished for complying with the law.

Therefore, inventions that have been implemented by software-programming of computers should be recognized as constituting statutory subject matter and should be held to be patentable so long as the invention satisfies the requirements of 35 USC 102 and 103 and the description and claims satisfy the requirements set forth in 35 USC 112, and the claims do not suffer from the defects of the Benson claims.

***19** VIII.

All the Evidence of Record Supports the Conclusion That Johnston's Programmed Computer Is a New Machine.

The statements of the Petitioner that programming of a general purpose digital computer does not make the computer a new machine, is not supported by evidence. It is merely a categorical, unsupported conclusion.

Johnston's patent application constitutes a document filed under oath or declaration (35 USC 115, 25). Johnston's application, therefore, constitutes evidence. Johnston describes the functions of the computer having his program stored in it. There is no denying that his computer is a machine or that it functions as described. The only question is whether it is a new machine.

Johnston's claims have been rejected as being obvious over the prior art. This rejection constitutes an admission by the Petitioner that Johnston's machine is different from any machine in the prior art. Graham v. John Deere, 383 U.S. 1, 17 (1966). Since the rejection is under 35 USC 103 but not under 35 USC 102, Johnston's machine must be a different, and hence new, machine.

There is also no denying that Johnston's programmed computer is useful.

35 USC 101 only requires that a machine be new and useful in order to constitute statutory subject matter.

By the Petitioner's own admission, therefore, it follows that Johnston's claims define statutory subject matter under 35 USC 101.

***20** IX.

Gottschalk v. Benson Favors Granting of Patents on Inventive Programming of Computers.

The majority of the Court below held that the Johnston invention constituted statutory subject matter and that the invention was properly claimed.

In the sole dissenting opinion concerning the issue of statutory subject matter in In re Johnston (A., pp. 17ff), the view was expressed by Judge Rich that Gottschalk v. Benson, supra, should be clarified. Amicus agrees with the majority opinion that

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the subject matter of Johnston's claims constitutes statutory subject matter and that the invention was properly claimed. Amicus also agrees with the dissenting opinion of Judge Rich that Gottschalk v. Benson, supra, should be clarified.

At some points, Petitioner concedes that programming of a computer may constitute patentable subject matter (Pet. Br. p. 29). But at other points (e.g., Pet. Br. pp. 28, 35) Petitioner is inconsistent and, Amicus believes, in error.

More particularly, at some points of his brief, the Petitioner seems to proceed on the assumptions (1) that Gottschalk v. Benson, supra, held that no process claim to an invention that is implemented by programming of a general purpose digital computer is patentable (Pet. Br. pp. 7, 8, 9, 12, 27, and 28); (2) that apparatus claims are equivalent to process claims in every respect (Pet. Br. pp. 7, 10, 31); and (3) that therefore all apparatus claims to inventions that are implemented by software programming of a general purpose digital computer are also non-statutory (Pet. Br. pp. 8, 12, and 29). With these three propositions, Amicus disagrees.

***21** The holding of Gottschalk v. Benson, supra, was a narrow one. In re Cristensen, 478 F.2d 1392 (CCPA, 1973). [FN9] The Benson holding was made with respect to process claims that had failed to satisfy any of four important criteria. Thus, in Benson,

> FN9. Lawlor, Reed C., "Benson and Beyond", Computer Law Service, Vol. 3-2 Art. 3 (Callaghan & Company, 1975). (A copy is on file with the Clerk.) See also, "Are Computer Programs Ever Patentable? Did The Patent Office Win?", BNA's Patent, Trademark & Copyright Journal, No. 124, pp. C-1 to C-6, 4- 19-73 (BNA, 1973). A comprehensive bibliography on computer program protection will be found in the 1974 Committee Reports of the Section of Patent, Trademark and Copyright Law of the American Bar Association, pp. 306-320.

1. The claims were not limited to any particular art or technology, AND
2. The claims were not limited to any particular apparatus or machinery, AND
3. The claims were not limited to any particular end use, AND
4. Furthermore, they were not limited to "transformation and reduction of an article 'to a different state or thing' ".

As a result, Benson's claims were broad enough to cover a mental process for carrying out a mathematical algorithm. That's what the case was all about (Tr. Oral Hearing, p. 30).

It has been known since at least as early as 1944 that the process by which even the most simple algorithms are carried out in a general purpose digital computer differs from mental processes for carrying out those same operations. [FN10] The Benson, et al. claims ***22** were not even limited to carrying out their process in a digital computer.

> FN10. Aiken, Howard H., et al., "A Manual of Operation for the Automatic Sequence Controlled Calculator", Harvard Univ. Press, 1946, in The Annals of the Computation Laboratory of Harvard University, Vol. 1, pp. 3-4.

While Benson's claim 8 mentioned a "reentrant register", Benson, et al. had urged

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during the prosecution of their application in the Patent Office that a claim specifying a "reentrant register" could be carried out with only pencil and paper. Claim 13 specified no element bearing any resemblance to apparatus. Thus the Benson, et al., claims were not limited to any particular machine, as held by the Court. Not being limited otherwise to satisfy any other criteria mentioned above, it is apparent that Benson, et al. were seeking a patent that would cover a mental process that could be carried out with only pencil and paper. In Benson it was only such broad claims that were held to be unpatentable.

In Benson, the Court clearly indicated that patents for programming of computers, on the basis of either process inventions or machine inventions, were not foreclosed, if the inventions were properly claimed. Thus, the Court implied that inventions that are implemented by programming of computers may not only be claimed as apparatus but even as processes if properly limited.

In contrast, with the claims of Benson, et al., Johnston's claims specify "means plus function", making it clear that his claims are for apparatus and hence are not for a process to be carried out without apparatus. Thus it is clear that Johnson does not consider his invention to lie in a mental process or in an algorithm, but in a machine. Consequently, under 35 USC 112, Johnston's claims cover only the machine that he has ***23** disclosed and equivalents thereof. Since the human mind is not a machine or any part thereof, Johnston's apparatus claims do not cover the human mind or its operations. In re Prater and Wei, 415 F.2d 1393, 1406 (CCPA, 1969). In re Bernhart and Fetter, 417 F.2d 1395, 1401 (CCPA, 1969), In re Foster, Kerns, and Sengbush, 438 F.2d 1011, 1015 (CCPA, 1971). Johnston's claims cover only a machine; and though a machine may perform a process, it is really only a "thing" that is visible to the eye (Tilghman v. Proctor, 102 U.S. 707, 728 (1880)).

Equating apparatus claims to process claims, as attempted by the Petitioner (Pet. Br. pp. 7, 10, and 31) is improper. While it is true that the skilled draftsman can write claims either in method form or in apparatus form in certain types of cases, this does not make the two types of claims equal. It has long been recognized that process claims and apparatus claims cover different inventions. One reason is that the process may be invented by one person and the apparatus by another (Robinson, Treatise on the Law of Patents, Vol. 1, p. 250). Even when the method and apparatus inventions are made by the same person, the rule is the same. Hence, process claims and apparatus claims differ not only in format, but in substance.

Therefore holding that Johnston's apparatus claims cover statutory subject matter is consistent with Gottschalk v. Benson, supra, especially since they specify particular apparatus in the manner set forth in 35 USC 112 and are free of other defects present in the claims of Benson, et al.

***24** X.

Patents for Inventions Implemented by Means of New Programs Take Nothing Away From, but Provide Something New for, Owners of Old Computers.

The Petitioner seems to argue, at page 35 of his brief, that the grant of a patent to an invention that involves changing an old computer into a new one by means of a program, would take something away from the public which already possesses the old computer. The fact is that the public would still have a right to use the old

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computer in the same old way that it always had and even new unpatented ways. The public would only be excluded from practicing the invention in the new programmed computer. This is true regardless of whether hardware programming or software programming is used to achieve the change. The fact that software programming results in only temporary change makes the principle more applicable than if permanent or semi-permanent hardware changes were made, since with software programming, the changed computer can be restored to its original state more easily, swiftly, and economically than if hardware changes were made.

In United States v. Dubilier Condenser Corp., 289 U.S. 178 (1933), the Court stated, at page 186:

"An inventor deprives the public of nothing which it enjoyed before his discovery, but gives something of value to the community by adding to the sum of useful knowledge."

It is sometimes argued that the patentee would take something away from the public if a patent is issued on the basis of an invention which would involve programming a computer in its practice, because the owner of the computer already has a right to use that program-***25** based invention in his computer (Pet. Br. p. 35 and CBEMA Br. p. 21). It is argued that computers are intended to use programs; therefore, the public should be entitled to use any new program in spite of the fact that the program was not invented by the manufacturer or owner of the computer. A more unjustified assertion of rights of machine builders and owners could not be made.

To appreciate how unjustified the Petitioner's position is, let us consider the reverse fact situation where the program has been developed and fully tested in one computer prior to the invention of another computer.

Suppose that you have discovered a new program and have marketed it for many years. Now suppose that the ABC company later invents a new computer that can use your program more effectively.

Wouldn't it be unfair to argue that you have a right to make and use the new computer without the permission of the ABC company since the ABC company should have no right to restrict your right to use your program on its new machine? Wouldn't it be unfair to argue that a patent on the new computer should not issue because it allegedly would diminish your right to use your program?

A patent granted to the ABC company on its new computer would take nothing away from you that you already had.

And so it is, granting a patent to the inventor of an implementation of a new program is perfectly proper under the patent law, since he takes nothing away from but adds to the sum of the public's useful knowledge. Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147 (1950).

***26** XI.

The CBEMA Relies on Statements of Foreign Origin That, in Fact, Do Not Support Its Position Against Patentability, but Instead Support Amicus' Position for Patentability.

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Time and space do not permit review and discussion of all the incomplete and unsupported statements in the CBEMA brief allegedly based on foreign views regarding inventions of the kind under discussion here. Such statements are really immaterial and irrelevant to the present case.

Nevertheless, since the CBEMA has raised such questions, Amicus desires to point to a few examples that demonstrate that patentability of software programming inventions is favored under foreign views.

At page 25 of its brief, the CBEMA refers to another possible form of protection that has been suggested for preserving some proprietary rights in computer programs (See also Pet. Br. p. 36). These statements might lead one to believe that the Advisory Group of the World Intellectual Property Association has recommended that a new form of protection be developed as a substitute for patent protection. The opposite is the case. Such a proposal (known as the IBM registration proposal), [FN11] while it may be useful in a limited way, cannot substitute for patent protection of meritorious inventions.

> FN11. "Software Protection, the Legal Protection of Computer Programs", two day conference at the Bedford Hotel, Brighton, Thursday and Friday, 13th and 14th November, 1969. Report of Proceedings, p. 48 (British Computer Society, May 22, 1970). (A copy of those proceedings has been filed with the Clerk of the Court.)

***27** The Advisory Group of the World Intellectual Property Association cited by the CBEMA, has recognized the importance of preserving the rights to obtain patents on program-related inventions, as follows:

"Patent protection should not be withheld from inventions for the reason that they involve computer programs when such inventions fulfill the traditional requirements of patentability". [FN12]

> FN12. 1975 WIPO (World Intellectual Property Organization) Meetings, Report AGCP/NGO/II/4, dated March 14, 1975, Annex II, page 8, March 12, 1975.

This view was reiterated in the final report of the Advisory Committee dated July 14, 1975, where it said,

"In the discussion on existing forms of legal protection, it was stressed once again that inventions fulfilling the requirements of patentability should not be excluded from protection merely because they related to a computer program or involved a software element. It was noted that patent protection could not apply to computer programs which do not meet the standard of inventiveness...." [FN13]

> FN13. 1975 WIPO Meeting, Report AGCP/NGO/II/11, dated July 14, 1975, Annex II, page 3, July 14, 1975.

and added,

"as regards legal protection of computer programs, a special type of protection should be established, without prejudice to the continuation of any existing forms of protection, in particular copyright, patent or unfair competition laws:...". [FN14]

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FN14. 1975 WIPO Meeting, Report AGCP/NGO/II/11, supra, page 5.

***28** The brief of the CBEMA also cites instances of actions in foreign countries that purportedly would be unfavorable to Johnston's position if they were U.S. cases. In Germany, with respect to which CBEMA has cited two vaguely identified and probably inapposite cases, in a third case, not cited by the CBEMA, the Senate of the German Federal Patent Court, which is the highest patent court in Germany, held that claims in the German Benson case that were narrower than those in the U.S. Benson case, were patentable under German law, and ordered the patent published. [FN15]

FN15. In the appeal, Western Electric Company Incorporated, Case No. 778, the German Federal Patent Court, May 28, 1973. An English translation of the opinion appears at 4 Computer Law Service Reports, p. 474 (Callaghan, 1974).

The CBEMA brief also refers to the effect that U.S. patents might have on trade.

The recognition that inventions implemented by programming of computers constitute patentable matter, would actually increase competition and public disclosure of important programs. It would compel hardware manufacturers to disclose their important programs in patents instead of keeping them secret. At the same time, recognition that such inventions are patentable, would facilitate growth of small software manufacturers, all of which appears to be opposed by many hardware manufacturers. [FN16]

FN16. These views were explained by Dr. G. Aspden, Director of European Patent Operations IBM, UK Laboratories, Ltd., in a panel discussion of a conference held by the British Computer Society in 1969. See "Software Protection, the Legal Protection of Computer Programs", supra at pp. 47- 48.

***29** XII.

Conclusion.

For the above reasons, Amicus urges this Court to clarify Gottschalk v. Benson, and particularly to hold that an invention that is implemented by programming a general purpose digital computer constitutes statutory subject matter under 35 USC 101.

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• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

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• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

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END OF DOCUMENT

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals.

Brief Amicus Curiae for Los Angeles and Philadelphia Patent Law Associations.

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***1** The Los Angeles and Philadelphia Patent Law Associations consist of lawyers who regularly counsel their clients regarding the assertion of, and defense against, patent rights. These Associations appear here in an attempt to assist the Court in an orderly development of the patent law and, more particularly, to urge that it would be inappropriate to create a per se rule of computer program unpatentability and that the law should be allowed to develop on a case-by-case basis in this complex area.

***2** In accordance with Rule 42 of this Court, these Associations have obtained the consent of both Petitioner and Respondent to the filing of this brief.

The Background Facts.

Computers have become a prominent part of contemporary life. The technology regarding computers has developed at an almost explosive rate and thousands of patents have been granted on computer-related technology. However, because of the rapidity with which computers perform their functions, a mystique of sorts has attached to them in the minds of some as having near-human qualities; a mystique that is baseless since computers in reality are as dependent on humans to operate them as are automobiles or aircraft.

The law of patents has not been immune from this mystique and it is believed that the present case bears witness to that fact. It is imperative that consideration of this case begin with a clear understanding of what is being claimed. As pointed out by the Court below, [FN1] claim 20 of the patent application is exemplary. For the purpose of determining whether the claim recites a machine, process, composition of matter or something else, it may be stripped of excess verbiage as follows:

FN1. In re Johnston, 502 F.2d 765, 767 (CCPA 1974).

"20. A ... machine system ... comprising ... a data processor including a memory ...; a processor for combining and comparing ...; input and output devices; ... said memory including ...; said control system including means for directing the processing ... said processing directing means including means for locating ...; and

***3** means for producing an output record ...; said output record producing means including means for identifying ..." (emphasis added).

Thus, the claim recites in its preamble that it is a "machine system" and then recites ten different tangible components of that system which are variously identified as processors, memory, input and output devices, a control system and means for directing, locating, producing and identifying. [FN2]

FN2. Claims couched in terms of "means for ..." are expressly sanctioned by the third paragraph of 35 U.S.C. 112.

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Were this case concerned with virtually anything other than computers, it would seem extremely doubtful that there would be any disagreement with the view that the foregoing claim recites a "machine" in the sense of 35 U.S.C. 101 and in the sense that that word is generally used.

However, the claim includes elements which are conventionally referred to as computer "software" and there has been continuing controversy as to how software should be treated under the patent law. [FN3]

FN3. See, e.g., 1974 Committee Reports of the Section of Patent, Trademark and Copyright Law of the American Bar Association, Report of Committee 410 at pp. 306-314, which sets forth a comprehensive bibliography of legal publications on the subject.

In a very oblique sense, an aspect of the software patentability issue reached this Court in Gottschalk v. Benson, 409 U.S. 63 (1972), but this Court was careful to state that it was not attempting to decide the broad issue and, at 409 U.S. 71, said:

"It is said that the decision precludes a patent for any program servicing a computer. We do not so hold." (emphasis added).

***4** The claims before this Court in Benson were not directed to a program, but rather to a method for converting a certain type of number, binary coded decimal numerals, into another kind of number, pure binary numerals. This method was held to be not patentable subject matter under 35 U.S.C. 101 because it was nothing more than an abstract principle even though it could be translated into a computer program. This was precisely the same as saying that the mathematical formula for converting fractions into decimals by dividing the numerator of the fraction by the denominator is not patentable and cannot be made patentable by recording it as part of a computer program any more than it could be made patentable by writing it on paper or engraving it in stone. This Court then went on to hold that if that type of program were to be made patentable, it would have to be by Congressional action and said, at 409 U.S. 72:

"It may be that the patent laws should be extended to cover these programs, a policy matter to which we are not competent to speak. The President's Commission on the Patent System rejected the proposal that these programs be patentable.... If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, ..." (emphasis added).

Thus, it would appear clear that this Court's discussion of Congressional action was directed only to the particular type of programs which it was considering in Benson, the only antecedent for "these programs" ***5** being programs directed to such mathematical formulas. This is all the more so when it is kept in mind that, as recognized by Petitioner (Pet. Br. 15, 16), programs for general purpose digital computers fall into at least two broad categories, viz., "system software" which performs only certain standard essential operations, e.g., translating, sorting, etc. and "applications software" which make the computer perform desired operations, i.e., control systems. Petitioner further recognizes that the program claimed in combination with a computer in the present case is a control program (Pet. Br. 16). In contrast, the method considered by this Court in Benson was a translating method and the discussion of computer programs in that case was limited to translating

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programs. Thus, the issues in this case have little in common with those in Benson.

The precept that patents may not be obtained for mathematical formulas was not new in Benson; the decision cites a long line of earlier cases which so held, to which could be added In re Bernhart, 417 F.2d 1395, 1399 (CCPA 1969).

However, the Court of Customs and Patent Appeals has indicated that it finds the Benson decision by this Court to be somewhat inscrutable, e.g., the concurring opinion by Judge Rich in In re Christensen, 478 F.2d 1392, 1396 (CCPA 1973) said:
"The Supreme Court in Benson appears to have held that claims drafted in such terms are not patentable--for what reason remaining a mystery."

***6** Against this background, Petitioner in the present case asks this Court to decide (as the first two of the three questions presented in the Petition):
1. Whether this Court's holding in Gottschalk v. Benson, 409 U.S. 63, that a new idea to be implemented by programming an existing computer is unpatentable when claimed as a new "process" also applies when the programmed computer is claimed as a new "machine system".
2. Whether programs for existing general purpose digital computers, however claimed, are patentable under present law. (Pet. 2). [FN4]

FN4. "Pet." refers to the Petition for Certiorari.
"Br. in Opp." refers to the Brief in Opposition to the Petition.
"Pet. Br." refers to Brief for the Petitioner.
"CBEMA Br." refers to Brief Amicus Curiae for the Computer and Business Equipment Manufacturers' Association.

***7** SUMMARY OF ARGUMENT.

Petitioner's question number 1 is obscurely put. It assumes as fact an issue which is hotly contested by the parties, viz., that the patent application claims are directed to an "idea" rather than a "machine", and then asks whether such supposed "ideas" are patentable under this Court's holding in Gottschalk v. Benson, 409 U.S. 63 (1972). The question could have been far more aptly put as follows:

"Do the patent application claims recite a 'machine' within the terms of 35 U.S.C. 101?"

However phrased, the answer to the question is that the claims do recite a statutory machine and that this Court's decision in Benson is applicable, if at all, only as a precedent which might bear on the question of whether an unpatentable old machine or a patentable new machine is claimed.

Petitioner implicitly recognizes this fact by focusing his discussion of statutory subject matter (Pet. Br. 20-24) on his notion of the "gist" of the invention (Pet. Br. 20) rather than on the claims themselves and by then discussing at much greater length (Pet. Br. 25-37) another question, not expressly stated as one of the "Questions Presented" in the Petition; that of whether claiming the combination of an existing computer and a new program is a claim to an old machine or a patentably new machine. This question would be meaningless if the claims did not recite a statutory machine.

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The amicus Associations believe that it would not be appropriate to formulate a per se rule of unpatentability, particularly in this case, for this question or its variant, petitioner's question number 2, the broad ***8** issue of computer program patentability, "however claimed", because:

1. Computer programs can take, and have taken, many forms and can be used to perform widely varying functions. It is unreasonable to ask this Court to formulate a per se rule of law regarding the patentability of such subject matter which will effectively deal with the wide variety of known variables and also deal with advances in technology not presently known. Furthermore, there is no overriding reason why such subject matter should be singled out for special treatment in the manner of, e.g., atomic energy. Certainly, Congress has taken no action to indicate that such special treatment is warranted.

2. The factual record in the present case, which consists only of respondent's patent application and the prior art cited by the Patent Office, is manifestly inadequate for an informed evaluation of the question. Neither the patent application nor the prior art attempts to deal with the broad question of computer program patentability and this Court would venture into deep water if it attempted to decide this issue without a fully developed record, including the testimony of experts who had been subjected to cross-examination and a documentary history of the development of computer programming to date.

As to Petitioner's question number 3, which goes to the ultimate question of patentability of the particular claims here in issue, the amicus Associations express no view, but do believe it appropriate to point out that Petitioner suggests an approach to this issue which ***9** does not conform to this Court's prescription in Graham v. John Deere Co., 383 U.S. 1 (1966).

The Claims Are Directed to a Machine, Not an Idea, and Are Statutorily Proper Under 35 U.S.C. 101.

As we have pointed out above, the machine system claims which are before this Court contain several indisputable "hardware" elements, e.g., the "data processor" and the "input and output devices". [FN5] Thus, there can be no doubt that these claims are directed to a "machine" as that term is used in 35 U.S.C. 101 and according to the ordinary usage of that term.

FN5. See claim 20, quoted in In re Johnston, 502 F.2d 765, 767 (CCPA 1974).

Petitioner attempts to transmute this machine claim into a nonstatutory "idea" claim by focusing only on the control system which may be constituted as a computer program. This is simply an incorrect analysis.

Indeed, Petitioner has found it impossible to avoid conceding that the claims before this Court recite a machine. These concessions are several and we cite a few.

First, we note that the principal discussion of this issue at pages 13-20 does not once make reference to the claims, but rather devotes extensive attention to Petitioner's characterization of the "invention". However, at the terminal portion of this discussion (Pet. Br. 20), Petitioner did make a key concession when he said:

"The 'means' disclosed by respondent are those of an ordinary general purpose

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digital computer, as presently used by banks, with a program directing these components of the computer to ..." (emphasis added).

***10** If that statement were amended to read, "The 'means' disclosed and claimed ..." it would accurately state the pertinent fact, viz., that the claims in question recite a machine, i.e., a computer, in combination with a program and the points remaining for decision are whether the recitation of the program is sufficiently definite, and if so, whether it is an apparatus limitation which imparts patentability to the claim.

Second, it is clear that Petitioner has attempted to avoid dealing with what the claims actually recite by emphasizing the "essence", "heart", and "gist" (Pet. Br. 10, 18, 20) of the invention, as Petitioner sees it. However, such discussion is entirely beside the point. As this Court said in Aro Manufacturing Co. v. Convertible Top Replacement Co., 365 U.S. 336, 345 (1961):

"Yet this Court has made it clear in the two Mercoid cases that there is no legally recognizable or protected 'essential' element, 'gist' or 'heart' of the invention in a combination patent." (emphasis added).

Just as it would have been improper to decide infringement in Aro by reference to only a part of the claim, so too would it be improper to decide patentability here only by reference to part of the claims.

Third, the discussion (Pet. Br. 25, 26) by Petitioner of the proposition that a new use of an existing machine is not patentable as a machine would be totally irrelevant if the claims presented here were not indeed directed to a machine. In fact, Petitioner, in the end, found it impossible not to say so:

"Thus, rather than seeking a machine patent by claiming discovery of a new use for an existing machine (barred by long-standing authority), ... he presses his claims in terms of a 'machine system' consisting of the programmed computer." (Pet. Br. 29, 30, emphasis added).

***11** This is a flat recognition of the reality that the claims are directed to a statutory machine.

Although the claims clearly meet the requirements of 35 U.S.C. 101, that is not the end of the matter. In order to fully decide the question of claim patentability, it is necessary to consider whether claims (a) meet the requirements of 35 U.S.C. 112 for definiteness and (b) the requirements of 35 U.S.C. 102 and 103 for novelty and unobviousness. In order to do this, it is necessary to analyze what the program is and what it does.

In the present case, the amicus Associations express no view as to the ultimate outcome of these latter questions, but do urge to this Court that they must be reached since the claims recite a statutory machine. We do, however, note that several possibilities exist. Among them are the following:

1. This Court could find that the control system is an apparatus limitation and then consider patentability pursuant to 35 U.S.C. 102, 103. [FN6]

FN6. Graham v. John Deere Co., 383 U.S. 1 (1966).

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2. This Court might have found that the control system does not define an apparatus limitation with the particularity required by 35 U.S.C. 112. [FN7]

FN7. This was the substance of this Court's holding when it invalidated claim 8 in O'Reilly v. Morse, 15 How. 62, 112 (1853). See Gottschalk v. Benson, 409 U.S. 63, 68 (1972). However, since Petitioner excludes Section 112 considerations from this case (Pet. Br. 5, fn. 5), it would appear that this issue has been conceded.

3. This Court could hold that the control system is not an apparatus limitation in the machine claim and, thus, while not improper, cannot be relied upon to impart patentability to the claim. [FN8]

FN8. Just as a process limitation in a machine claim, while not improper, cannot impart patentability to the claim, In re Stephens, 345 F.2d 1020, 1023 (CCPA 1965); In re Moeller, 117 F.2d 565, 567 (1941).

***12** The last of these is the main thrust of Petitioner's Brief which contends that Benson requires such a result. We shall demonstrate that it does not and that it would be inappropriate to fashion a per se rule of unpatentability in this regard. However, in order to present this discussion in an orderly manner, we will first treat Petitioner's question number 2, which is broader, and goes to the patentability of programs for existing general purpose computers, "however claimed".

Benson Does Not Mandate the Unpatentability of Programs for Existing Computers.

The scant attention which Petitioner devotes to his question number 2 simply assumes the erroneous conclusion that this Court held in Benson that any and all programs for existing general purpose computers are unpatentable. In so doing, Petitioner relies solely upon this Court's statement at 409 U.S. 73, "if these programs are to be patentable", Congress will have to provide additional statutory authority (Pet. Br. 36). This, of course, raises the question of what type of program this Court was referring to when it said "these programs". Petitioner assumes in its brief, without any supportive reasoning, that "these programs" means any and all programs for general purpose digital computers. [FN9] Such an assumption must fall in the face of this Court's statement in Benson at 409 U.S. 71:

FN9. In apparent contradiction to the recognition at page 2 of his Reply Brief of the "possibility of patentability" of programs.

"It is said that the decision precludes a patent for any program servicing a computer. We do not so hold."

***13** Rather, when the Benson decision is read as a whole, the following is clear:

1. The patent application claims before the Court were not directed to a computer program, but rather to a "method of converting signals from a binary coded decimal form into binary" and a "data processing method for converting binary coded decimal number representations" (409 U.S. 73, 74).

2. The question which this Court was deciding in Benson was not the patentability of computer programs but rather "whether the method described and claimed is a 'process' within the meaning of the Patent Act" (409 U.S. 64).

3. The controlling concept underlying the decision in Benson is that an idea,

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i.e., a principle in the abstract, cannot be patented (409 U.S. 67, 71).

4. In Benson, this Court concluded that the impermissible patenting of an abstract principle "would be the result if the formula for converting BCD numerals into pure binary numerals were patented in this case" (409 U.S. 71).

5. The process claims were considered to be so "abstract and sweeping" as to be capable of being "performed through any existing machinery or future-devised machinery or without any apparatus." (emphasis added, 409 U.S. 68).

6. This Court also noted, "the mathematical formula involved here has no substantial practical application except in connection with a digital computer" such that if a patent were granted, "the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself" (409 U.S. 71,?? 72).

***14** It was only then that this Court said "It may be that the patent laws should be extended to cover these programs" and that it was up to Congress to determine "if these programs are to be patentable". In so doing, this Court transferred its attention from what was being claimed and what it was holding unpatentable, viz., the "idea" or mathematical formula, to the end use of that idea or mathematical formula, viz., a computer program employing the formula. Thus, this Court's several references to "these programs" must, we believe, be taken to mean programs which are nothing more than computer translations of abstract mathematical formulas. This is, in effect, no different from holding that such an abstract mathematical formula cannot be patented by writing it on a piece of paper and then attempting to patent the paper together with the writing as an "article".

For example, this Court's holding in Benson could be expressed with regard to more familiar subject matter by observing that it dealt with a mathematical manipulation of precisely the same character as the conversion of fractions to decimals by dividing the numerator of the fraction by the denominator. This conversion of fractions to decimals is similarly an abstract princple and could not be rendered patentable by writing it down or by translating it into "computer language" in a computer program.

A Per Se Rule of Computer Program Unpatentability Would Be Inappropriate.

It would be a long, and unwarranted, step to conclude that because the abstract mathematical formulas considered by this Court in Benson were unpatentable and, presumably, would be unpatentable if claimed as ***15** computer programs, that any and all computer programs, "however claimed", are unpatentable. To do so would be tantamount to saying, "there is nothing left to invent; all that can be invented has been done" and would thrust this Court into the role of attempting to command the tide of technological development relating to computer programs under circumstances not unlike those confronting King Canute. Rather, this is an occasion for exercise of the "responsible humility" which this Court has deemed appropriate in other cases. [FN10]

FN10. Beauhernais v. Illinois, 343 U.S. 250 262 (1952); Rochin v.California, 342 U.S. 165, 168 (1952).

In this regard, as recognized by Petitioner (Pet. Br. 15, 16), programs for general purpose digital computers fall into at least two broad categories. viz., "system software" which performs only certain standard essential operations, e.g.,

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translating, sorting, etc. and "applications software" which makes the computer perform desired operations, i.e., control systems. Petitioner further recognizes that the program claimed in combination with a computer in the present case is a control program (Pet. Br. 16). In contrast, as we have just pointed out, the method considered by this Court in Benson was a translating method and the discussion of computer programs in that case was limited to translating programs.

Furthermore, when a program functions to control a computer, the program is not unlike a cam arrangement in conventional machinery, i.e., the computer responds to the control program in much the same way that the machine responds to the cam control. We believe that this Court would reject rather firmly the contention that no cam arrangement could ever be patentable, "however claimed". This would remain so even ***16** if the cam arrangement was removable such that a first cam could be removed and a second substituted. Patent Office Class 74, subclass 567, is entitled "Cams" and contains many patents. Thus, the analogies to piano rolls, etc. (Pet. Br. 35) offered by Petitioner are hardly exhaustive and are somewhat misleading.

Still further, if this Court were ever to attempt to decide the broad question of whether computer programs for general purpose computers are patentable, however claimed, it would be hard to imagine a record less suitable for consideration of that issue than the present case. [FN11] Here, we have only the ex parte record created in the Patent Office, the factual content of which consists only of the patent application itself and the prior art. There has been no testimony, expert or otherwise, and it is certain that the patent application before this Court made no attempt to address itself to the broad question of patentability of computer programs. The numerous references (our count is 20) to extra-record technological and media sources in another amicus brief (CBEMA Br.) bear witness to the paucity of the factual record before this Court and it is worth noting that the statements made in those extra-record sources have not been subjected to cross-examination nor is there any way for this Court to determine whether those statements represent minority or even discredited views. The amicus Associations have had neither the time nor the technologically informed resources to be of assistance to the Court in this regard.

> FN11. As in United States v?? Appalachian Electric Power Co., 311 U.S. 377, 423 (1940), it is "beyond the judicial function" to "predetermine the rights" of different parties in a matter "pregnant with the future controversy".

***17** A Per Se Rule That a New Program Combined With an Existing Computer Cannot Be Patentable Is Equally Inappropriate.

If a per se rule that programs for existing computers are unpatentable is inappropriate, this is all the more so with regard to claims directed to programmed computers, i.e., to the combination of such programs with existing computers. Petitioner conceded this at page 2 of his Reply Brief when he said:

"To the contrary, we recognize the possibility of patentability if a program co-acts with an ordinary computer in a 'synergistic' way, if the program is carried out with newly-invented apparatus, or if a program produces a new use for an old machine sufficiently inventive to be patentable as a process." (emphasis added).

Thus, Petitioner's strenuous argument that the combination of a new program with an

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existing computer does not create a patentably new machine seems to be directed much more to the facts of the present case than to the general proposition and Petitioner suggests as much, e.g., Pet. Br. 31, where the argument is reduced to "respondent's patent application, at least", and the reiteration of the "synergism" exception at Pet. Br. 29. The latter is nothing more than a statement that the claims must be unobvious within the meaning of 35 U.S.C. 103 as per the cases cited by Petitioner.

Indeed, it is the test for patentability under 35 U.S.C. 103 in the manner prescribed by this Court in Graham which should be applied in this case. However, Petitioner makes contentions which do not conform to the traditional approach of Graham and it is to this which we turn next.

***18** Patentability Should Be Determined According to the Prescription of Graham.

In Graham, this Court held that the issue of unobviousness was to be decided by first determining the scope and content of the prior art, the level of skill in the art and the differences between the prior art and the claimed invention, and then determining whether such differences would have been obvious to one of ordinary skill in the art at the time the invention was made.

In a serious distortion of the prior holdings of this and other courts, Petitioner urges that the inventor's own conception should be used as prior art against him and even if the conception is unobvious, the implementation of that conception (or "idea") must also be unobvious in order for patentability to exist (Pet. Br. 22-24). Patentability should not be, and has not been, judged by such a 4-foot yardstick. The courts and Congress have been consistent in recognition of the fact that the hurdle of unobviousness must be cleared only once in order to obtain a patent. A few examples will suffice. Charles Goodyear's conception or "idea" that rubber could be effectively vulcanized by adding sulphur to a mass of rubber is generally recognized as a significant contribution to mankind and was patented. Yet, the implementation of that idea amounted to nothing more than adding sulphur to rubber and the implementation could hardly have taken any other form. Similarly, the conception or "idea" of Wallace H. Carrothers that certain chemicals could be reacted to produce a useful plastic material (nylon) was implemented by placing those chemicals in a suitable container, e.g., a test tube or beaker, and allowing them to react. Given the idea, could that implementation ***19** have been held to be unobvious? The same would be true of most chemical reactions. Yet, a patent was granted to Carrothers and hundreds of thousands of other chemical reactions have been patented. Still further, 35 U.S.C. 100(b) expressly provides that a new use of a known machine, process, or composition is patentable as a process. Given the conception or "idea" of making such a new use of a known machine, process or composition, Section 100(b) would be rendered meaningless if there was an additional requirement that the implementation of the idea also be unobvious. In this regard, it is also to be noted that Section 100(a) provides that "invention", as used in Title 35 of the United States Code, means an "invention or discovery" (emphasis added). Stated differently, if applicant's "idea" is, in effect, used as prior art against him, the result is a hindsight approach to the issue of patentability which this Court has many times condemned, most recently in United States v. Adams, 383 U.S. 39, 50 (1966) where, in the course of determining that a patent directed to a battery was valid, this Court ruled that it "begs the question" to state that the battery components claimed in combination were known to have been used individually as such components in other

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batteries. Rather, this Court pointed out that the issue was whether "bringing them together" was patentable. However, given the idea of bringing them together, the implementation of that idea could not be said to be unobvious since it involved nothing more than putting the components together in a conventional manner to construct a battery. To the extent that there is language in Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127 (1948) which can be read to express a different standard of patentability (***20** as contended at Pet. Br. 23, 24), that language must be kept in the context of Funk and not interpreted in a manner inconsistent with Graham, Adams and the 1952 Patent Act. [FN12]

FN12. See Blonder-Tongue Laboratories v. University of Illinois Foundation, 402 U.S. 313, 333 (1971), requiring use of the Graham standards.

Finally, we note briefly some rather serious flaws in law and logic in other contentions pressed by Petitioner on the issue of patentability. They are:

1. That a grant of patent claims directed to a computer in combination with a program would "impermissibly" (Pet. Br. 36) withdraw from the public its right of free access to the computer once patents, if any, covering the computer had expired. This is flagrantly untrue. Such withdrawal as might result would be no different from the "withdrawal" of the wheel which occurred when a patent was granted on the automobile and, again, on the airplane, etc. It is a self-evident fact of technological development that most inventions are made by making new combinations of old elements, e.g., the very patents on computers to which Petitioner does not seem to object would "withdraw" from use transistors, capacitors, resistors, switches, etc., which themselves may or may not be the subject of expired or unexpired patents.

2. That grant of a patent on the combination of a computer and a program would "conflict" with patents already granted to the inventors of the computers (Pet. Br. 36, footnote 37). This is a misstatement of fact. It frequently occurs that a first patented device, e.g., a switch, is used in a second patented device, e.g., a computer. If this ***21** occurs, the computer inventor and manufacturer who uses the patented switch must pay license royalties or infringement damages. Certainly, grant of the second patent, e.g., on the computer, does not deprive the owner of the patent on the switch "of all the uses to which it can be put".

3. That granting a patent on the combination of a computer and a program would be a "simple" way of "circumventing" the principle that an idea is not patentable by using the "facile drafting device" (Pet. Br. 29) of claiming the invention in the form of a machine rather than as an idea. This is somewhat startling. The entire thrust of Benson and the many precedents which it cites are that ideas must be claimed in tangible form to be patentable. To do so is no more "facile circumvention" than the claiming of a new use of an existing composition as a process (e.g., a method of treating a disease by administering the compound) rather than the composition (e.g., a known chemical compound which would be unpatentable), as prescribed by 35 U.S.C. 100(b).

4. That "hardware" may be patentable but "software" in combination with a computer is not (Pet. Br. 32). The words "software" and "hardware" must be used with caution. Much "software" would be considered by the ordinary observer to be quite "hard", e.g., the tapes, drums, discs, etc. described by this Court in Benson at 409 U.S. 65. Furthermore, the fact that something is "soft", e.g., made from paper, does not render it unpatentable. For example, Patent Office Class 283 is devoted to "Printed Matter" and has existed in that form since 1918, during which time thousands ***22** of

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patents have been granted for paper goods such as the labels and tags of subclass 18 and the checks of subclass 58 of Class 283. Thus, to determine patentability based upon the hardness or the softness of the subject matter is to use the wrong criterion. Rather, the issue must be decided on the basis of what the subject matter is and what it does.

5. That there is something inherently repugnant to the law in a "legal fiction" (Pet. Br. 13). If it were a legal fiction that the combination of a computer and a program were a new machine rather than actual fact (a determination which we believe must be made on a case-by-case basis), it would remain to be decided whether the legal fiction should be given effect. So-called legal fictions are deeply woven into our jurisprudence, e.g., the proposition that a corporation is a person, and they have been employed to the great benefit of society, not to its detriment.

6. That a "program" and a "formula" are identical (Pet. Br. 17, footnote 16) and that all programs are for the purpose of "translation" (Pet. Br. 29). We have earlier noted that refutation of this notion found in Petitioner's Brief itself, at pages 15 and 16, where it is recognized that it is only one type of program that performs a translating function and that another type performs a control function.

***23** Conclusion.

The amicus Associations urge this Court to:

1. Affirm the holdings of the Court below that the claims recite a statutory machine within the meaning of 35 U.S.C. 101;

2. Decline to fashion a per se rule of unpatentability for computer programs or programmed computers.

While the amicus Associations express no view on the ultimate issue of the patentability of the claims presented in this case, they do urge that this issue be decided according to traditional principles of patent law. Petitioner has clouded this issue with several erroneous contentions which we have pointed out above.

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Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173465 (Appellate Brief) Brief for the Respondent (Oct. Term 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

• 1975 WL 173470 (Appellate Brief) Brief Amicus Curiae for Software Associates, Inc. (Oct. Term 1975)

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• 1975 WL 173468 (Appellate Brief) Brief Amicus Curiae for the American Patent Law Association. (Sep. 22, 1975)

• 1975 WL 173467 (Appellate Brief) Brief Amicus Curiae for Universal Software, Inc. (Sep. 03, 1975)

• 1975 WL 173464 (Appellate Brief) Brief for the Petitioner (Jul. 31, 1975)

• 1975 WL 173466 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Jul. 21, 1975)

• 1975 WL 173463 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Mar. 13, 1975)

• 1974 WL 175938 (Appellate Brief) Reply Brief for Petitioner (Oct. Term 1974)

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1974.
September 22, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals.

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***1** I.
THE NATURE AND THE INTEREST OF THE AMICUS.

A. The American Patent Law Association.

This brief amicus curiae is submitted by the American Patent Law Association ("APLA") [FN1] under Rule 42(2) of ***2** this Court. Letters from the parties' counsel, consenting to the filing of this brief, are on file with the Clerk of this Court.

FN1. APLA's membership-at-large elects the officers and other who form APLA's 19-member governing body, the Board of Managers. The filing of this brief on behalf of APLA has been authorized by the Board of Managers and approved by its Executive Committee.

APLA is a nationwide association of approximately 4,000 members including judges, law teachers, copyright and trademark lawyers, and over half the patent lawyers in the country from private, corporate, and government practice.

Unlike some specialties of law practice where the plaintiffs and defendants are often represented by predominantly separate legal fraternities, in patent law the same individual attorneys may appear as often on the plaintiff's side as on the defendant's side of patent, trademark and copyright litigation, and on either the licensor or licensee side of negotiations for licenses. By such experience and membership composition, this association is well balanced in the realities of the patent law in action.

B. Interest of the Amicus.

APLA has no interest in and takes no position with respect to the patentability of the particular invention of respondent's pending patent application. More particularly, no position is taken with respect to the issue of unobviousness of the claimed subject matter.

Amicus submits that this case should be decided in accordance with established principles of patent law. Amicus is concerned that the Government's brief tends to confuse some of these established principles.

***3** II. SUMMARY OF THE ARGUMENT.

A. The inclusion of a programmed digital computer in the enabling disclosure of a patent application claiming an innovation neither confers upon nor removes from that innovation the quality of being a patentable invention. Programmed digital computers are used to implement many different innovations. Patentability of these innovations should be determined in accordance with well established principles of patent law and not by sweeping pronouncements of special law developed from consideration of one or two particular cases.

B. Where the inventor's idea for an invention is novel, unobvious and in the technological arts, the idea is part of the invention as a whole and must be considered in determining the unobviousness of the invention.

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C. When a patent has expired on a specific apparatus, such as a computer, only that apparatus and not patentable improvements thereon will "fall into the public domain."

D. Amicus agrees with the three-part view expressed in the Government's Reply Brief for Certiorari that recognizes "the possibility of patentability if a program co-acts with an ordinary computer in a 'synergistic' way, if the program is carried out with newly-inventive apparatus, or if a program produces a new use for an old machine sufficiently inventive to be patentable as a process." (G. Rep. 2). [FN2] Amicus is concerned however, that the Government's subsequently filed main brief has qualified that view so as to render it meaningless.

FN2. G. Rep. refers to the Government's Reply Brief for Certiorari. G. Br. refers to the Government's main Brief.

***4** E. The claims of a patent application are the true measure of a patent grant. The Government ignores respondent's claims and instead focuses on the alleged underlying programming idea. "Program" is not well defined in this case and the patentability of "programs" per se is not an issue. Computer technology has already advanced so far that the Government's oversimplifying "programming" analogies are meaningless.

***5** III.

ARGUMENT.

A. The Inclusion of a Programmed General Purpose Digital Computer as Part of the Enabling Disclosure of a Patent Application Claiming an Innovation Neither Confers Upon Nor Removes From That Innovation the Quality of Being a Patentable Invention.

The first paragraph of 35 U. S. C. § 112 requires that the applicant disclose his innovation in terms which enable a skilled person to practice the invention. That is, the applicant must submit an "enabling disclosure."

The inclusion of a properly programmed digital computer as part of the enabling disclosure of a patent application cannot be determinative of patentability because computers are used to implement patentable innovations in the useful arts, and they are used to implement unpatentable innovations in the liberal arts. Digital computers are used to perform mathematical calculations, compose music, make fine arts drawings, operate factories and warehouses, refine oil, generate electric power and perform numerous other tasks. [FN3] No general rule can justly describe the patentability of all of the foregoing.

FN3. "Digital Control and Automation Systems-A look at Computer Control and Automation in Automative Manufacturing," Computer Design, October, 1973; "How real-time computers work in today's automatic warehousing," Material Handling Engineering, January, 1975; "Refinery operations controlled by double computer," Petroleum Review 27, 471-6 (1973); "DEH: The computer takes over turbine control," Power, August, 1973; "Digital Control and Automation Systems-System Measures and Sorts Green Lumber at 38 Boards/Min. with 99.5% Accuracy," Computer Design, July, 1974.

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Nevertheless, Petitioner's first question on page 2 of its brief is based on the premise that this Court in ***6** Gottschalk, Acting Commissioner of Patents v. Benson et al., 409 U. S. 63 (1972), held that a new idea implemented by programming an existing computer is unpatentable. Petitioner seeks extension of a decision that the method claims in that case were unpatentable to a holding that the apparatus claimed in the present case is unpatentable.

However, the only similarity between the present case and Benson is the presence of a general purpose digital computer in the enabling disclosure of the involved patent application.

To adopt the Government's interpretation of Benson and the extension thereof to apparatus claims would preclude patenting innovative machines in the arts which have hitherto prospered under the patent system.

The Government's First Question Is Based On A Fallacy Because Benson Did Not Rule Out Process Claims For All Inventions Wherein Programming Is Part Of The Enabling Disclosure.

The Benson patent application disclosed a mathematical technique that could best be performed by using an appropriately programmed digital computer. This Court found the claims of the Benson application so broadly written and so unlimited in scope as to pre-empt the underlying mathematical discovery itself. The Benson claims were the same type of "overweening claim" that had been struck down in O'Reilly v. Morse, 56 U. S. (15 How.) 62 (1853). The Benson claims were "not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use" and pre-empted the "algorithm itself." 409 U. S. 63, 72.

However, the presence of a "computer" or a "program" is not determinative of whether a claim should be struck down for over-breadth as by pre-empting an algorithm. ***7** The proper test, as indicated by this Court's decisions in Morse as well as in Benson, is whether a nonstatutory "idea" such as a mathematical algorithm is being claimed so broadly that the claim is, in effect, attempting to pre-empt the nonstatutory idea itself.

The claims to the algorithm of Benson would have been no more or no less patentable if the process set forth in those claims had been based on a disclosure of a known wired machine or analog computer. Similarly, apparatus claims supported only by a disclosure of known apparatus acting in a known way to perform a mathematical algorithm and of such breadth as to preempt the algorithm itself are not statutory regardless of whether a "program" or "general purpose computer" is or is not included in the enabling disclosure. [FN4]

FN4. One cannot look at the hypothetical Benson claim prepared by the Government and set out in Appendix D of its Petition, by itself, to determine whether in scope it is overclaiming so as to cover the algorithm itself. With a sufficient supporting disclosure showing the specific apparatus elements involved, the claim presented by the Government is a proper claim. How broadly the claim will be interpreted in an infringement situation on someone else's structure is a question of equivalency that may or may not be established in the particular facts of the case.

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APLA therefore suggests to this Court that the question of the patentability of programs or of inventions based upon an enabling disclosure including a programmed computer is irrelevant to the resolution of this appeal.

B. Where the Inventor's Idea for an Invention Is Novel, Unobvious, and in the Technological Arts, That Idea Is Part of the Invention as a Whole and Must Be Considered in Determining the Unobviousness of the Invention.

Whatever the decision of this Court on the immediate issue of patentability of the invention claimed here, it is ***8** imperative that the rationale on page 22 of the Government's brief be discarded. The Government argues that:

"Even when an idea is unobvious its implementation must be unobvious, as well, to justify the grant of a patent monopoly, whether the implementation involves a process or a product." (G. Br. 22)

The brief further states that the "means or mode of implementing the idea must extend beyond the routine, conventional or obvious applications of the idea that follow once the idea is known." The argument is completely contrary to the established principle, codified in 35 U. S. C. § 103, that the invention as a whole must be considered in determining patentability.

Does the Government contend that the inventor's idea is prior art to the apparatus or process for carrying it out? That this contention is antithetical to the law of patents is to be noted from the thousands upon thousands of patents granted on electrical, mechanical and chemical inventions in which the way of implementing the idea is perfectly clear from the idea itself.

This Court, in Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U. S. 45 (1923), treats one facet of the question. There the patentee discovered that wrinkling and malformation of paper in a paper making machine occurred because the stock did not flow fast enough at a critical point in the process. Eibel simply increased the pitch of the path of the stock to take advantage of the force of gravity to increase the flow rate. This Court held the patent valid, deciding that the patentee had made a patentable contribution in discovering the problem even though the solution was deemed to be routine. Certainly in the Eibel case the "invention as a whole" was considered in determining patentability.

***9** Since at least as early as the Eibel case, the "invention as a whole" has been referred to in determining patentability. [FN5]

> FN5. See also, Trio Process Corporation v. L. Goldstein's Sons, Inc., 461 F. 2d 66, n. 18a (3 Cir. 1972); In re Aufhauser, 399 F. 2d 275, 277 (CCPA 1968); In re Conover, 304 F. 2d 680, 683 (CCPA 1962); and In re Roberts and Burch, 470 F. 2d 1399, 1401 (CCPA 1973).

The Government's brief obscures the issue in its faulty analysis at page 22 of its brief. There are at least three distinct situations involving an idea and its implementation, and the Government has chosen to see only two of them. Basic to an understanding of the misconception that can result is the distinction between "obviousness" and the constitutional consideration requiring that the invention relate to the "useful arts."

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The first situation is where the idea does not directly relate to the useful arts and the implementation is claimed so broadly as to cover all uses of the idea or is claimed so as to cover the obvious uses of the idea. Ideas not directly related to the useful arts include recognition of a law of nature or a mathematical algorithm. For this situation, patent coverage is not permitted. Examples of this are Benson, supra, and Funk Bros. v. Kalo Inoculant Co., 333 U. S. 127 (1948).

The second situation is where the idea is not directly related to the useful arts but the implementation of that idea is claimed to cover unobvious mechanisms or processes in a useful field. Then patent coverage is possible, Mackay Radio & Telegraph Co. v. Radio Corporation of America, 306 U. S. 86, 94 (1939). In this situation the "patent monopoly may be granted, not on the idea, but on the inventive process or product." (G. Br. 24).

The third situation, totally ignored in the Government's brief, is where the idea relates to the useful arts ***10** and is unobvious. It must then be considered as part of the "subject matter as a whole," 35 U. S. C. § 103. In this situation it is erroneous to give weight to the obviousness or unobviousness of the implementation. The Eibel case, supra, is in point. There, having analyzed the problem in terms of an unobvious idea or discovery, the implementation was obvious, but the patent was upheld in view of the unobviousness conferred through the discovery.

The Government in its brief has created the possibility for considerable mischief in the patent law by improperly expanding the limited holding of Funk Bros., supra, to produce a rule of law that encompass all inventions, not only those directed to natural phenomena. [FN6]

> FN6. The Court of Appeals in Armour Pharmaceutical Co. v. Richardson-Merrill, Inc., 396 F. 2d 70, 74, read the opinion in Funk to lead to "the test of patentability of a natural phenomenon" and not to a test of patentability for all inventions, as stated by the Government in its brief.

The fallacy of the broad pronouncement that in all instances the means of implementing an idea must be unobvious can be seen from this Court's decision upholding the patent in U. S. v. Adams, 383 U. S. 39 (1966). Here, again, the implementation required only ordinary skill, but it was the idea that imparted patentability to the claims in the Adams patent. As this Court stated in Graham et al. v. John Deere Co. of Kansas City et al., 383 U. S. 1, 32 (1965), it is the invention as a whole that must be viewed in determining patentability and the whole encompasses both conception and implementation.

It may not be clear whether the Government intended this sharp redirection in the law of patents, but it is certain that destructive violence would be worked on the statute and on the patent system itself should the Government's "rationale" be adopted by this Court.

***11** C. When a Patent on a Specific Apparatus, Such as a Computer, Has Expired, Only That Apparatus and Not Patentable Improvements Thereon Will "Fall Into the Public Domain".

The Government has noted two truisms in patent law but it has to come to a

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conclusion not supported by either truism, by any logic or citation of authority. First, the Government has noted (G. Br. 35) that when a patent expires its subject matter falls into the public domain. Second, the Government has noted (G. Br. n. 27) that an inventor of a machine is entitled to the benefit of all uses of that machine. However, it is a complete non-sequitur to go from these two basic statements to the Government's contention that all inventive improvements utilizing a previously patented computer must fall into the public domain with the demise of the first patent on that computer.

The obtaining of a patent on a machine does not prevent others from obtaining patents on unobvious improvements on the machine, on an unobvious combination incorporating the machine as one element of the novel combination, or on new and unobvious uses of the machine. Such later patents are permitted under 35 U. S. C. §§ 100-103 whether that machine is the subject of an expired or unexpired patent or had never been patented.

When a patent expires the invention which is claimed in that patent falls into the public domain. By refusing throughout its argument in this case to consider patent claims, the Government has failed to distinguish between the claimed invention of a patent and the commercial equipment which incorporates that invention and brings the invention to the market place. That which is claimed in the patent falls into the public domain on the expiration of the patent. Whether or not the commercial equipment ***12** also falls into the public domain is dependent upon whether other valid and unexpired patents are applicable to that specific equipment. [FN7]

> FN7. There are proper aspects of the problem of the "second and further partial monopoly" (G. Br. 35) where a second patent is obtained on a product already the subject of a prior patent. In Brulotte v. Thys Co., 379 U. S. 29 (1964), this Court had before it a situation where seven patents were incorporated into the licensed machines. The Court held that it was improper to collect royalties "which accrued after the last of the patents incorporated into the machine has expired," 379 U. S. 30 (emphasis added). According to the argument presented by the Government in this case, the collection of royalties after the first of the patents incorporated into the machine had expired should have been illegal.

A patent on an improvement invention does not withdraw from the public its right of free access to materials already available (G. Br. 36). The public's access to the unimproved apparatus, here the computer, is in no way impaired by patents that may issue on novel improvements to that computer. Only the public's access to the improvement invention is temporarily subject to the patent, but that improvement invention is perforce not already available within the public domain.

An improvement which is truly unobvious may merit the praise accorded by this Court to Eibel's paper-making invention:

"His was not a pioneer patent, creating a new art; but a patent which is only an improvement on an old machine may be very meritorious and entitled to liberal treatment. Indeed, when one notes the crude working of machines of famous pioneer inventions and discoveries, and compares them with the modern machines and processes exemplifying the principle of pioneer discovery, one hesitates in the division of credit between the original inventor and the improvers; and certainly finds no

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reason to withhold from the really meritorious improver, the application ***13** of the rule 'ut res magis valeat quam pereat' which has been sustained in so many cases in this Court." (261 U. S. at 63)

The Government's brief suggests that a patent on a novel and unobvious improvement of apparatus previously patented by someone else should be invalid, per se, as an extension of the first patent. The proper question has always been whether the improvement is obvious or unobvious under 35 U. S. C. § 103 in view of the prior patent and all other pertinent prior art. It is interesting to note that under the Government's view one would never reach the § 103 issue if there is a prior patent, expired or unexpired, which discloses the apparatus on which the present invention is an improvement.

When the patents covering the computer used to implement respondent's invention herein expire, the claimed subject matter of those patents will fall into the public domain. But there is neither reason nor authority to support the Government's ill-founded contention that all patentable improvements of such computers, whether machine or process inventions, and whether or not involving programming as part of their enabling disclosure, must also fall into the public domain.

D. An Innovation in Digital Computer Programming May Be Patentable if the Program Co-Acts With an Ordinary Computer in an Unobvious Way, if the Program Is Carried Out With Newly Invented Apparatus or if the Program Produces a New Use for an Old Machine Sufficiently Inventive to Be Patentable as a Process.

APLA submits that the foregoing statement requires nothing more and nothing less than an analysis of the type set forth in Graham v. Deere, supra. Though it is a ***14** difficult analysis, it has, nevertheless, been carried out with only minor variations since the time of Thomas Jefferson, as set forth in Graham v. Deere.

The Court has been asked to make such an analysis under 35 U. S. C. § 103 in the present case. Amicus expresses no opinion on the issue of obviousness except to point out that all inventions, including those in which a programmed computer is included in the enabling disclosure of the invention, must be measured by the same statutory standards including 35 U. S. C. § 103.

Amicus disagrees with the Government's view (G. Br. 14) that the questions of statutory subject matter and obviousness are "interrelated." These are separate questions and should be decided in the sequence which would best serve public policy and judicial economy. Whether an invention is obvious or not can have no bearing on whether the subject matter of that invention is or is not statutory. If this were not true, an invention might be "statutory" at its creation, but rendered "non-statutory" rather than merely "unpatentable" after it had passed into the public domain. But "statutoryness" has never before been thought to be a simple function of the passage of time. Accordingly, "obviousness" and "statutory subject matter" are quite separate, independent and not interrelated questions.

Although Petitioner argues that the innovation in the instant application is obvious under 35 U. S. C. § 103, Petitioner recognizes the possibility of patentability in other cases if the program co-acts with the computer in an unobvious way (G. Br. 29). The head-note of this section is a statement from the

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Government's Reply Brief for Certiorari, p. 2. [FN8] Although that reply brief recognizes ***15** the possibility of patentability if a computer program produces a new use for an old machine, in its main brief the Government asserts that a new use of a computer is not patentable. The Government argues that this Court in Benson held process patents unavailable for inventions involving programs for general purpose digital computers and extends this "holding" to new uses for such computers which must be claimed as a process (G. Br. 27). The fallacy in Petitioner's changed position is that this Court did not hold process patents unavailable for all programming related inventions as previously discussed. The question of new uses was not an issue in Benson nor is it an issue in the present case.

> FN8. In paraphrasing the Government's position, APLA has used the term "unobvious" instead of "synergism" since the former term appears in 35 U. S. C. § 103.

E. The Government Has Misused Established Principles of Patent Law in Failing to Focus on the Claims and Has Failed to Define Properly the Terms Used.

The claims of a patent are the measure of the patent grant, Graver Tank & Mfg. Co., Inc. v. Linde Air Products Co., 336 U. S. 271, 277 (1949), Aro Mfg. Co., Inc. v. Convertible Top Replacement Co., Inc., 365 U. S. 336, 339 (1961). The Government appears to dismiss that which is claimed as nothing more than a mere matter of form. It characterizes claim language as "inventive semantics" (G. Br. 29). The Government focuses on the "monopoly on [the] idea that respondent seeks" (G. Br. 11); respondent's "programming idea" (G. Br. 13); respondent's "alleged inventiveness or novel discovery" (G. Br. 17); and respondent's "alleged invention" (G. Br. 18) without coming to grips with what respondent has claimed. What has been claimed by respondent must be examined as it was examined in Benson. The Benson decision was not one based on the mere "format" of the claim but, on the contrary, it was based on the entire context of the claims.

***16** In trying to make the complex sound simple, the Government has drawn several misleading analogies. For example, it has argued that "[s]imply put, the difference between a general purpose digital computer ... and a fixed wire computer is like the difference between a player piano and a music box, respectively." (G. Br. 16). The analogy is wrong for a number of reasons.

The technology has advanced to the point where most of the Government's distinctions between the fixed wire computer and the general purpose digital computer are obsolete. Examples of this include "minicomputers" and "microcomputers," machines which have the attributes of both general purpose and fixed wire computers.

"Minicomputers" are much smaller than the IBM 1400 disclosed in respondent's patent application. [FN9] Because of its relatively low cost, the minicomputer has found wide application as a substitute for mechanical, electromechanical, analog electrical and digital electrical systems commonly used in industry. Once the minicomputer is programmed to serve a particular function in an industrial system, the program usually remains unchanged. The minicomputer effectively becomes a special purpose computer, and performs like the fixed wire computer referred to in the Government's brief. The choice of whether an innovation should be embodied in a

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programmed minicomputer or in a fixed wire computer often turns on economic considerations. [FN10]

FN9. "Minicomputers that run the factory," Business Week, December 8, 1973; "Now minicomputers run machine tools," Business Week, August 12, 1972.

FN10. "Hard-wired numerical controllers yield to efficient minicomputers," Electronics, April 12, 1973.

More recently, another form of general purpose digital computer has become commercially available which is smaller and lower in cost than the minicomputer. Aptly ***17** termed "microcomputers," these machines are formed by combining a semiconductor read-only memory with an integrated circuit microprocessor. [FN11] The read-only memory has components which may be embraced within the volume of a postage stamp and which may contain tens of thousands of items of information. It performs all of the functions of the changeable "core" program storage unit of conventional digital computers. Changing the "program" in a machine using a read-only memory requires insertion of a physically different memory element. This is a rearrangement of parts into a new combination. Combinations of physically different parts causing a machine to exhibit a new, useful and non-obvious "rule of action" have always been recognized as giving rise to patentable invention. [FN12]

FN11. "Microcomputers-Evolutionary successor of the minicomputer, the microcomputer is a set of microelectronic 'chips' serving the various computer functions. It has opened up new realms of computer applications," Scientific American, May, 1975; "Computers: First the Maxi, Then the Mini, Now It's the Micro," Science, Vol. 186, December 20, 1974; IEEE Transactions on Industrial Electronics and Control Instrumentation, Vol. IECI-22, No. 3, August, 1975, pp. 290-360; "News Scope-$15 microprocessor coming for simpler applications," Electronic Design, August 16, 1975; "Microprocessor Sparks a Quiet Revolution in Instrumentation," Electronic News, Vol. 20, No. 1039, August 4, 1975; "Microprocessors & minicomputers: what will the future bring?", EDN, November 20, 1974.

FN12. The Government (G. Br. 15) acknowledges that by using a different program in a computer "the configuration of its circuitry can be readily changed." Such new and unobvious configurations of circuitry have always been within the scope of the patent statutes.

The music box, player piano analogy is not applicable to programmable digital computers for another reason. Every machine is characterized by its rule of action which resides within the machine itself. Robinson, The Law of Patents, § § 173 and 175 (1890). Machines that are different can be characterized by the different rules of action ***18** resident in each. The rule of action of a music box is to have its steel comb plucked by the spikes set into its rotating drum; the rule of action of a player piano is to have its keys actuated according to the pattern of holes punched in its paper roll. Each type of machine plays the "music" by slavishly striking the note identified by the spike on the drum or the hole on the paper. Though each machine can be characterized by more detailed rules of action spelling out its particular distinctive instrumentalities, both machines can be characterized on a broader level, by the common rule of action: "strike the identified note." Thus,

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when a "new" drum or paper roll is inserted that differs from the "old" drum or paper roll solely because of the musical significance contained, the "rule of action" of neither machine is changed. Though there might be an advance in the art of music from a paper tape of "Chopsticks" to a paper tape of a Sousa march, the change is not in the rule of action of the machine but only in the fine art of music.

This is not the case with computers. The advent of the programmable digital computer made available for the first time a machine having a truly changeable "rule of action." [FN13] In the music box or player piano, only notes could be struck. The digital computer is so flexible that it can run entire chemical processing plants or make connections for transcontinental telephone conversations. For each of these different situations machines with different "rules of action" are required. In each case the "rules" are encoded in the computer memory merely by patterns of "bits." The Government wrongly asserts that these vastly different technologies differ from each other only by "the meaning one chooses to assign outside the computer ***19** to a particular configuration of binary digits or 'bits' in its memory." (G. Br. 7, quoting the Board). [FN14]

> FN13. "Programmable devices-Your best buy in control?", Modern Materials Handling, February, 1975.
>
> FN14. A programmable digital computer has more than a mere array of "notes" which may be struck for each binary "bit" in its memory unit. It typically has a whole array of otherwise unrelated logic devices and peripheral units which are organized only when the "program" is loaded and run. Unprogrammed, the machine has been correctly analogized to a mere storehouse of parts. Applying the Robinson criteria, an unprogrammed computer has no rule of action or at best only a simple rule of action which makes it capable of interacting with a program which is fed into it. This is the correct import of the Bernhart "doctrine," (G. Br. 33) which is more accurately a statement of technological fact than a legal doctrine.

From the above it can be seen that in this case both the term "computer" and the term "program" have not been well defined even though they are central to the Government's argument. The Government (G. Br. 15) notes that there are systems programs and application programs and then indicates that it is the application program that "is generally denoted by references to computer programs in common parlance." Their brief then assumes that one is only talking "in common parlance."

Amicus CBEMA in its brief (n. 3), also discusses systems programs and applications programs but considers that a system program is "an integral part of the computer." APLA concurs and considers that a computer is a unique combination of electrical components interconnected by that "integral part," the requisite programs that determine the basic operations, the "rule of action" of the computer.

The rule of action may be permanently incorporated or wired into a machine; it may be permanently but alterably incorporated, as by the use of the semiconductor read-only memory; or it can be transiently incorporated, as by reading into a memory certain bit states for the elements of that memory. A "fixed wire computer" and a "general purpose computer" (G. Br. 16) are again undefined terms. ***20** Both terms can

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apply to a digital computer (contrary to the implications of footnote 14, G. Br. 15). And both terms can apply to a computer with a read-only memory. By speaking "in common parlance" the Government confuses, not clarifies, the issue.

IV.
CONCLUSION.

The Government's first question (G. Br. 2) assumes that Benson held process patents unavailable for all programmed operations of a computer. This assumption is erroneous and cannot be the basis for the sweeping pronouncement of unpatentability of programmed apparatus which the Government propounds.

By this question and other statements in its brief the Government confuses, not clarifies, the issues. The legal principles to be applied are not dependent on the presence or absence of programming in the enabling disclosure.

The question of the patentability of programmed machines and programmable processes should be dealt with in the same way as with identical questions that would arise with any other types of machines or processes.

The inventor of a new, useful and unobvious process or apparatus should not be deprived of the incentives of the patent statutes merely because his invention uses program control in its implementation.

Dann v. Johnston
1975 WL 173468

Briefs and Other Related Documents (Back to top)

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• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1975.
September 3, 1975.
ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Brief Amicus Curiae for Universal Software, Inc.

Charles Winn Sims, 2208 Piedmont, Wichita Falls, Texas 76308, Counsel for Amicus Curiae.

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ERRATA

Page 1, in the caption, change "Patients" to "Patents".

Page 8, line 5, change "relationship" to "relationships".

Page 9, footnote 7, line 21, change "correspondense" to "correspondence".

Page 10, line 27, change "mis:apprehension" to "misapprehension".

Page 22, footnote 19, line 8, before "C24-5036-3" insert "Form".

Page 25, line 4, change "equivalence" to "equivalent".

Page 25, line 28, change "contraindicted" to "contraindicated".

Page 29, line 6, change "p. 18" to "p. 16".

Page 34, line 28, before "process" insert "a".

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***1** I QUESTIONS PRESENTED

1. Whether a new machine, which is defined as patentable subject matter under 35 USC § 101, becomes unpatentable if it is formed by the interconnection of components of a so-called general purpose digital computer which is known, the interconnections being effected by novel and unobvious program software to define the new machine's specification.

2. Whether the collection of structurally and functionally interrelated components commonly referred to as a general ***2** purpose digital computer, when restructured by

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program software to form a physical realization of a machine specification of an accounting machine, comprises patentable subject matter under 35 USC § 101 when accurately claimed as a machine system.

II

INTEREST OF UNIVERSAL SOFTWARE, INC.

This brief amicus curiae is submitted by Universal Software, Inc., a Connecticut corporation, (hereinafter referred to as "Universal") in accordance with Rule 42(2) of this Court. Both petitioner and respondent have consented to the filing of this brief. The letters of consent have been filed with the Clerk of this Court, accompanying the required number of copies of this brief.

Universal is engaged in the design, manufacture, and sale of machine systems specifications (program software) which, when combined with the hardware commonly known as general purpose digital computers, restructures such hardware into new and enhanced machines having capabilities not present in the hardware as sold by the manufacturers. Universal is exemplary of independent software houses who produce and sell machine specifications of either enhanced general purpose digital computers or special purpose digital computers. These software producers have made heavy investments of their ingenuity, time, effort, and capital in making highly significant contributions to the arts of computer systems design, which contributions are deserving of patent protection.

Although Universal does not have any direct interest in the patent application of respondent, Universal does have a deep and abiding interest in the determination of the broader issues in this case, since this Court's decision presumably will resolve the question of patentability of computer program software in a machine system claim format. The resolution of these issues in favor of respondent will affect the development of the data processing industry in the United States in a beneficial manner, encouraging disclosure of commercially viable and technically ***3** superior products to potential investors in the financial community and to potential users and improvers in the technical community, whose interests are best served by making available all existing knowledge of the state of the art. Such disclosures may be in the form of either a patent specification, or a purely defensive publication aimed at foreclosing the grant to another of a patent on the published invention. Thus, the widest possible dissemination of knowledge of the art will result, and thereby insure that advances will occur in the program software arts at an accelerated rate characteristic of developments in other crucial and dynamic technologies. The ultimate effect of a holding that computer programs of the type sought to be patented in this case are patentable subject matter would be to encourage competition, not to foreclose it.

This brief undertakes to refute certain inappropriate technical characterizations of program inventions, which, regrettably, have gained currency and caused great uncertainty in the law. Alternative characterizations more in keeping with technical reality will be presented, showing that a program invention such as that of respondent (1) is statutory subject matter and (2) is appropriately claimed as a machine system, the manner best suited to set forth the invention in its true dimensions.

Thus, it is Universal's position that the majority of the Lower Court correctly

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refrained from applying this Court's decision in Gottschalk v. Benson, 409 U.S. 63 (1972).

III

THE NATURE OF THE COMPUTER AND COMPUTER PROGRAMS

The machine known as a general purpose digital computer affords a tremendous problem-solving capability by providing within a relatively small space all of the various components requisite for fashioning more powerful machines for solving problems derivative from a highly-industrialized environment. Circuits are uniquely ***4** defined by program software interconnection of the various components, these circuits being suitable for storing, retrieving, organizing, and manipulating signals representative of parameters meaningful within the field of interest. Thus, the computer expands the ability of the technical community to translate problems perceived in any segment of an industrial environment into machines or machine systems capable of solving such problems. Although a general purpose digital computer has the inherent potential to be fashioned into a large variety of machines capable of solving a large variety of problems, the number of machines which may be fashioned is limited by the ingenuity, time, and funds available to implement a machine solution to a particular machine problem to be solved.

Every special purpose digital computer operates solely in accordance with its specification. Its specification is its program. The program defines the various circuits which manipulate the data signals in accordance with an effective procedure for machine control which is accomplished in a step-by-step manner. Although the terms have frequently been confused, the effective procedure is distinct from the algorithm defining the industrial problem to be solved. [FN1] In this industrial context, the algorithm is the original procedure proposed to describe the conceptualization of the machine problem to be solved, expressed in a mathematical or other symbolic manner. The effective procedure is that sequence of operations which is, in fact, effective as a control mechanism and which, in fact, defines a machine solution to a machine problem to be solved. [FN2]

> FN1. M.L. Minsky, Computation: Finite And Infinite State Machines, Prentice-Hall, Inc., Englewood Cliffs, New Jersey (1967), pp. 105-107. This is presently a basic text of computer science, and was originally used by Professor Minsky as a textbook in the Department of Electrical Engineering at the Massachusetts Institute of Technology.
>
> FN2. Ibid.

A machine specification may be created for defining a machine suitable for determining the proper course to the moon, for example. Using a convenient language such as mathematics, there is developed a model of the ***5** environment within which the fully-formed, thoroughly-tested machine is to function. Logical sequences of operation of that machine may then be designed symbolically, for example, by a flow chart. The next step in the machine's design is the development of program software embodying a representation of a detailed set of operations for altering the general purpose digital computer's functioning to define the procedure then thought to be effective for simulating the new computer sought to be specified. This sequence of operations, or untested program, is successively refined until the new machine is completely specified. In devising the machine specification, it is necessary for the

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designer to be knowledgeable about the particular computer's characteristics, i.e., how it actually manipulates signals representative of the data of interest, in order for him to optimize his new machine with respect to the characteristics of the old.

Typically, the general purpose digital computer provided with the untested program is an inoperative device. Considerable skill may be required in carrying out the implementation of the machine solution, particularly in view of the limited number of fixed operations which may be performed by the general purpose digital computer. Devising the finished machine, often through many intermediate debugging steps, generally requires the continuing attention of a professional whose insights may be valuable in both the original perception of the machine problem to be solved and the design of the machine to solve it. In many instances, the inventive process is so complex as to require substantial innovative effort on the part of every member of a project team, including the computer machine process specialist.

The difficulty of conceptualization and communication of this subject matter may be readily appreciated by reference to the rather strained analogies which have been employed by Amici in Benson and in the instant case. Notable is the player piano analogy (Pet. Br. 16, 35). [FN3] No player piano includes conditional logic circuitry, which is essential in forming any digital computer. Such circuitry ***6** enables conditional branching, i.e., selection of the next operation on the basis of the result of a completed operation. The specification of interconnections of conditional logic circuits in a general purpose digital computer is necessary in order that the machine fashioned therefrom, namely, a special purpose digital computer, be capable of changing from one functionally operative state to another responsive to events represented by internally-manipulated data signals during the course of its functioning. Although it may be refreshing to have a player piano change its tune by reforming its internal structure without external manipulation, no such instrument has ever done so.

FN3. "Pet. Br." refers to Petitioner's Brief on the merits.

It has been said that a computer program is equivalent to the paper music roll instructions to a player piano (Pet. Br. 35). However, the paper music roll does not restructure the player piano; it merely causes certain notes to be played in a predetermined sequence. Thus, if a program software were truly like a piano roll, it would simply cause the general purpose digital computer to generate a predefined sequence of signals in response to the signals from the program machine. This is not the manner of interaction of the program with the general purpose computer. The technological reality is that program software causes new circuits to be formed in the general purpose machine, [FN4] thereby changing it to a special purpose ***7** machine [FN5] or an enhanced/extended general purpose machine [FN6] having new problem-solving capabilities which qualitatively or quantitatively extend beyond the capabilities of the general purpose machine.

FN4. That a general purpose digital computer may accurately be denominated a machine has a sound basis in the theories of electronics and computer science. See Minsky, supra note 1, p. 200.

FN5. A sound theoretical basis for the proposition that a program converts a general purpose digital computer (or machine) into a special purpose digital

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computer (or machine) is found in Minsky, supra note 1, p. 200. Precise definitions adequate to the statement of a theoretical basis for this phenomenon are found in section 11.2 at p. 204 and in Theorems 14.1-1 at p. 257 and 14.2-1 at p. 258. Significant milestones in development of such theoretical basis are the following papers: A.M. Turing, "On Computable Numbers. With An Application to the Entscheidungsproblem," Proc. London Math. Soc., Ser. 2-42 (1936), pp. 230- 265: H. Wang, "A Variant to Turing's Theory of Computing Machines", Journal ACM, Vol. 4, No. 1 (1957).

FN6. An application program defines structure which is a special purpose digital computer. A system program defines structure which is an enhanced or extended general purpose digital computer. A straightforward mathematical technique will be applied to the consideration of the structure of machines. In the strictest sense, it is mathematical only to the extent that logic is mathematics, an important proposition in the study of machines. There will be applied the technique of inductive proof.
For every positive integer n, let P(n) be a proposition that is either true or false. If (i) P(l) is true and (ii) whenever this proposition is true for the positive integer n it is also true for the positive integer n + l, then P(n) is true for all positive integers n.
Proposition: A new program defines a new machine.
Let an application program represent the proposition P(l). Then no system program is consistent with the Proposition, i.e., there exists no program to which an integer greater than l may be assigned, all system programs being available when the application program is defined. We have a contradiction, so that it is irrational to start with the application program.
Let some system program represent P(l), another P(n) and another P(n + l). Then if the Proposition can be shown to be true, it will be true also when choosing n to represent the last system program found by the application programmer to be helpful in designing his machine, and n + l to represent identically the application program.
By this reasoning alone there is no structural difference between a system program and an application program.
Induction is succinctly defined in Olmsted. Intermediate Analysis-Theory of Functions Of One Real Variable, Appleton-Century-Crofts, New York, N.Y. (1956).

***8** A general purpose digital computer has been said to be a warehouse of functionally unrelated parts. This is true only in the sense that the relationships of the parts are not defined for the solution of any specific problem. The relationships of the parts within a general purpose machine are well-defined in the mechanical sense, but are almost endlessly variable in the electrical sense. Program software in combination with a general purpose digital computer creates what has been termed "instant hardware" in the form of either an enhanced general purpose digital computer or a special purpose digital computer by making the electrical connections which form those computers.

IV
ARGUMENT

A. The Lower Court Correctly Refrained From Applying Gottschalk v. Benson

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In Gottschalk v. Benson, this Court decided essentially that a signal conversion method which is defined in mathematical terms is not a process within the meaning of 35 U.S.C. § 100(b). It does not appear to have been appreciated that mathematics has a broad, generally-accepted definition which encompasses not only number systems and the manipulation of numbers, but also logistics, axiomatic investigation, symbolic language, and, for that matter, experience. Since mathematics is the language employed by engineers and scientists to express their experience, it is unrealistic to have a definition of mathematics in law different than that understood by Euclid, Descartes, Leibniz, Gauss, LaPlace, Newton, Fourier and most significantly, Galois, the Father of ***9** Modern Mathematics, whose notion of isomorphism [FN7] leads one to the conclusion that a mathematician is more nearly a pioneering observer than a chronicler. That which is best communicated in terms of a language mathematical in nature and experiential in content and context should be available to describe an invention which has been conceived and reduced to practice as a procedure or sequence of steps. In any event, it was not held that an exhaustive list of patentable processes had been compiled by the year 1972, nor are processes, defined ***10** by an algorithm or otherwise, before the Court in the present case.

> FN7. That Evariste Galois is often referred to as The Father of Modern Mathematics is attributed to the extraordinary breadth of modern structures whose behavior can be examined, explained and digested with reference to his original notion of isomorphism, defined most simply as a one-to-one correspondence between elements of groups. The groups of interest have certain properties, the most important of which is the manner in which elements are combined while maintaining their identity as members of that group by the definition of membership therein. The one-to-one correspondence survives combinations. This is the basis for abstract algebra (synonym of modern algebra). G. Birkhoff and S. MacLane, A Survey of Modern Algebra, The MacMillan Company, New York (1958). The simplest example is the simultaneous consideration of an algebra (or set of rules) governing combinations of odd and even integers and one of the number system base two (or modulo 2) which has but two integers. 0 and 1.:

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even + even = odd + odd = even   even + odd = odd
even + even = even . odd = even  odd . odd = odd
0 + 0 = 1 + 1 = 0                0 + 1 = 1
0 . 0 = 0 . 1 = 0                1 . 1 = 1
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The one-one correspondense is even ?? 0: odd ?? 1, which is an isomorphism.

Both the most general control of instantaneous interconnections of circuits in a general purpose digital computer and the specific manner in which it counts can be explained with precisely this isomorphism. For a much deeper analysis of theories of structures of general purpose digital computers traceable to the work of Galois, there is to consider: O. Rabin and D. Scott, "Finite Automata And Their Decision Problems," IBM Journal of Research and Development, Vol. 3, No. 2 (April 1959), pp. 114-125; B. Krohn and J.L. Rhodes, "Algebraic Theory of Machines," Mathematical Theory of Automata, Polytechnic Press, Brooklyn (1963), pp. 341-384: M.P. Schutzenberger, "On Finite Monoids Having Only Trivial Subgroups", Information and

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Control 8 (1965), pp. 190-194.
Galois died in 1832 at the age of 21 years.

In the decision below in the instant case, the Court of Customs and Patent Appeals held that a general purpose digital computer combined with program software to form a machine system for performing a financial banking procedure is patentable subject matter under 35 U.S.C. § 101. However, Amicus CBEMA urges that the record does not show that a machine has been invented or disclosed in respondent's patent application, and points to respondent's statements that "the invention is being sold as a program to banks" and "was reduced to practice in the software form of computer programs ..." (CBEMA Br. 8). [FN8] These statements in no way conflict with respondent's assertion that such programs define a control system in the form of a special purpose digital computer. Respondent has not conceded that the merchantable product, viz., program software, is anything less than a machine for restructuring a general purpose machine to form the machine system known as a special purpose machine for carrying out a financial banking procedure. Thus, respondent's real contribution is much more than a financial banking algorithm. Since respondent's claims are drawn to a machine system, clearly the intent of respondent is to define his invention as a machine system, not as an algorithm. Amicus CBEMA's basic misapprehension of the commercial realities of program machine design and implementation would lead one to confuse a flow-charted and coded financial banking procedure with an effective procedure in the form of a completely debugged and tested program. Only the latter, i.e., the running program, is a commodity which is merchantable to astute and knowledgeable businessmen such as bankers and systems accountants. Absent this merchantable program machine, whether in the form of punched cards, magnetic tape or disks, the general purpose digital computer is not capable of solving any problem. Thus, a general purpose machine in combination with an application program defines a machine system for solving a problem. The notion that ***11** program software simply defines computer routines (CBEMA Br. 8, note 9) is alien to those in the data processing community, particularly to those technically competent to carry a symbolic representation of a procedure into a running program. Any implication that simplicity is an attribute of either the design or implementation of the machine system claimed by respondent does not conform to reality.

FN8. "CBEMA Br." refers to Amicus CBEMA's Brief on the merits.

Financial banking procedures whose implementation has been principally manual, or has involved certain automated procedures requiring frequent or continuing human intervention, have been considered methods of doing business, which like mathematics of the genus defining laws of nature or scientific principles, have been considered unpatentable per se. In contradistinction, respondent has disclosed and claimed a machine system, i.e., a hardware implementation of his effective procedure which is the solution to a machine problem to be solved. Therefore, respondent should be considered as having defined patentable subject matter, notwithstanding that the machine problem may have been formulated as a numerical procedure or algorithm. Unless this Court holds that respondent's application program machine is patentable subject matter as claimed, it will be impossible to adequately define the scope of novel and unobvious hardware implementations in the form best suited to convey to the technical community the essence of extremely valuable and technologically superior contributions to the art of program machines. To a person working in this

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art, a recitation of a particular general purpose digital computer or a class of general purpose digital computers suitable for adaptation to carry a disclosed program invention into effect in the form of a special purpose digital computer is sufficient to enable the practice of the invention disclosed in respondent's patent application, viz, a control system or special purpose digital computer. Such a disclosure would be enabling in patent applications disclosing novel and unobvious program machines of any genus, including Amicus Universal's commercially viable, novel and unobvious system program machine defining an enhanced general purpose digital computer.

***12** Program software interactively combined with a general purpose digital computer should be considered patentable as a machine system by virtue of the synergistic interaction with the general purpose digital computer, notwithstanding that the program may be described in terms of an algorithm which may or may not be expressed in a mathematical language. Anderson's Black Rock v. Pavement Salvage Co., Inc., 396 U.S. 57 (1969). In the instant case, there is precisely the synergism considered by this Court in Anderson's, i.e., that the program and the computer combined produce a function which neither the program nor the computer can produce alone. In any event, Anderson's dealt with a combination of old elements; the instant case deals with a new program in a machine system.

The interaction of the program machine with the general purpose machine is also within the definition of synergism as it is commonly understood in the biochemical sense. Such interaction is much the same as neurochemical reactions causing muscles to expand and contract in synchronism, thereby achieving the control and coordination of the musculature requisite to accomplishing a task. Such biochemical activity does not involve any intellectual process.

It is not asserted that the relation between chemical reactions in a physiological context and program control of the various components and sub-systems of the general purpose digital computer is a completely satisfactory analogy. It is simply pointed out that the simultaneous action of separate agencies toward the achieving of a given purpose is not a concept alien to human experience. However, biochemical reactions are more readily correlated with the conditional responses of a special purpose digital computer to data signals representative of an environment than the predefined responses of a player piano to the sensing of the holes in the piano roll having no more information content than some version of a composer's creation, and lacking any subtle phrasing at that.

***13** B. The Inventive Process, The Persons Skilled In The Art, And the Technological Realities Of Program Machine Design Must be Understood In Order To Assess Inventions In This Art.

1. The Inventive Process In The Art Of Program Machine Design.

Among those making significant contributions to the art of program machine design, there is a unitary view of the process of invention of a program machine as including these elements:

(1) formulating the machine problem to be solved;

(2) flow-charting a purportedly effective procedure for solving the machine problem;

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(3) devising a program machine defining said purportedly effective procedure: and
(4) implementation, i.e., getting the program onto the general purpose machine and running.

The fourth element, implementation, has not yet been treated before this Court. It is absent from the petitioner's characterization of the inventive process (Pet. Br. 16-17), notwithstanding the Pickwickian use of the word "implementation" in imprecisely defining a second "mode of activity". Petitioner has stated that it would be "useful" to consider only the first three elements of the inventive process. This narrow view is indeed "useful" if contributions to the art of program machines are to be characterized as nothing more than intellectual exercises. To this unworthy end, it is "useful" that program machines conceived and expressed originally in abstract terms be thought of as nothing more than abstractions. If this false premise is accepted, it then becomes easy to ***14** apply the mental step doctrine [FN9] to deny the patentability of the enhanced general purpose machines or the special purpose machines which, like all other inventions, are the fruit of intellectual activity. Such an undesirable result is comparable to denying the patentability of electrical circuits which are the physical embodiment of a mathematical model consisting of parametric equations defining complex interrelations and interactions among circuit components. [FN10]

FN9. See Halliburton Oil Well Cementing Co. v. Walker, 145 F.2d 817 (9th Cir. 1944); Application of Heritage, 150 F.2d 554 (C.C.P.A. 1945); Application of Abrams, 188 F.2d 165 (C.C.P.A. 1951); Application of Lundberg, 197 F.2d 336 (C.C.P.A. 1952); Application of Venner, 262 F.2d 91 (C.C.P.A. 1958); Application of Jones, 373 F.2d 1007 (C.C.P.A. 1967); Application of Prater, 415 F.2d 1378 (C.C.P.A. 1968), mod. on reh. 415 F.2d 1393 (C.C.P.A. 1969); Application of Bernhart, 417 F.2d 1395 (C.C.P.A. 1969); Application of Mahoney 412 F.2d 742 (C.C.P.A. 1970); Application of Musgrave 431 F.2d 882 (C.C.P.A. 1970); Application of Foster, 438 F.2d 1011 (C.C.P.A. 1971); Application of Benson, 441 F.2d 682 (C.C.P.A. 1971), reversed on other grounds sub nom. Gottschalk v. Benson, 409 U.S. 63; Application of McIlroy 442 F.2d 1397 (C.C.P.A. 1971); Application of Waldbaum 457 F.2d 997 (C.C.P.A. 1972); Application of Christensen 478 F.2d 1392 (C.C.P.A. 1973).

FN10. C.A. Desoer and E.S. Kuh, Basic Circuit Theory, McGraw-Hill Book Company (1966).

2. Persons Skilled In The Art Of Program Machine Design.

Three innovators in the art of program machine design are representative of the statutorily-hypothesized [FN11] "person skilled in the art". Many real-life individuals could fall within more than one of these catagories.

FN11. 35 U.S.C. § 112, first paragraph.

(1) The Empiricist
His inventions are conceived and reduced to practice, in the form of an actual implementation, on the basis of his degree of familiarity with the manufacturer's hardware, existing systems programs, and the cooperative association between the two. His machine specification, when appropriately manipulated and combined with the

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products of the hardware manufacturers, may be an application ***15** program which defines a special purpose digital computer optimized with respect to the application's definition, the utilization of the hardware, and the utilization of the existing systems software. Alternatively, the Empiricist may devise a machine specification which, when appropriately manipulated and combined with the products of the hardware manufacturers, works a new synergism therebetween which is physically embodied in an enhanced or extended general purpose digital computer.

(2) The Systems Architect

His in entions are machine specifications which define the original synergism between the manufacturer's hardware and systems software, that synergism being embodied in an integrated general purpose digital computer the specification of which may define the starting point for an Empiricist concerned with implementation or development of application program machines for defining special purpose digital computers. Of course, it is also true that the original system program machine may define the starting point for an Empiricist concerned with designing an enhanced or extended general purpose digital computer. (If the second Empiricist has made his contribution, the first Empiricist would typically design his machine from the components of the enhanced machine.) The Systems Architect is an inventor, his protestations to the contrary not withstanding. His protestations are typically induced by his employers, who wish to foreclose any alternatives to the "free" systems software offered with their machines.

(3) The Academician

His contributions may be in the field of computer science, which is concerned with future implementations or machine development. The Academician has made some of his most significant contributions in the investigation of the computer and its role in society. From a purely technical standpoint, the Academicians of interest are those whose perceptions lend an insight into the nature of the computer's structure. A tool for these investigations in ***16** many instances is mathematics of a genus which has been defined as axiomatic or logistic, as opposed to definitive and descriptive of naturally-occurring phenomena.

3. The Interaction Of The Empiricist, The Systems Architect, And The Academician.

In reality, the program machine design specialization is distributed among all three of these hypothetical innovative specialists. Thus, that one Empiricist may proceed from the work of a Systems Architect, or from the work of another Empiricist, in no way conflicts with our definitions. It is always true that the innovator must isolate his machine problem from all others, and develop his specification of a machine solution either independently or cooperatively in association with members of a project team concerned with that problem and the new machine to be fashioned for its solution.

The Systems Architect, having a keen appreciation of the principles of computer science (and engineering, to the extent that it is distinct), is able to communicate an accurate definition of the structure of the machine to the balance of the technical community, i.e., the collection of Empiricists, so that they may have a precise definition of the design parameters affecting at least the implementation portion of a specific machine problem to be solved. The Academician performs a variety of functions in advancing the state of the art. These functions may best be

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set forth in historical sequence of advances within two repetitive cycles. The first cycle includes Observation, Abstracting, Formalization, Propagation, Observation .... The second cycle includes Logical Formulation, Perception and Definition of Development in terms of a Formalism, Propagation, Logical Formulation .... The first cycle is relatively short in duration and more nearly responsive to immediate demands of the technical community formed by the Empiricists. There has been no completed second cycle. Certain of the demands of at least the technical community formed by the Systems Architects are met in the near term by second-cycle activities. The advancement of the state of the art of program machine design will always be the result of discrete events along the course of both cycles.

***17** Turning to the work of the Empiricist, what exists insofar as he is concerned is precisely what he "sees". "What is seen by the application programmer or the systems programmer" is an expression frequently used in the art, principally because the structure of the general purpose digital computer is exceedingly complex. Therefore, there is a common practice of explaining its structure in terms of a paradigm [FN12] which facilitates communication of these labyrinthian complexities. Three working definitions of terms required to explain both the manner in which the Architect communicates his knowledge to the Empiricist and the paradigm are set forth hereunder.

FN12. E.W. Dijkstra, "The Structure of the T.H.E. Multiprogramming System", Comm. ACM, Vol. 11, No. 5 (May 1968), pp. 341-346.

Virtualization:
making available to the Empiricist an understanding of the resources of the general purpose digital computer of interest to that Empiricist as a member of a subclass of either application program machine designers or enhanced/extended machine designers.

Hierarchial view:
the viewpoint that the general purpose digital computer is best described in the technically accurate terms of machines within machines, or nested machines. [FN13] There are less pertinent alternative views, viz., the process view [FN14] and the resource management view [FN15], but these are merely devices facilitating understanding in a less general case. One's choice of viewpoint is determined by whether a convenient explanation or a definitive phenomenological exposition is desired. Systems Architects communicate using terminology in alignment with all three views simultaneously. [FN16] This ***18** is because these views and their terminology are not in conflict as media of communication.

FN13. Ibid.

FN14. S.E. Madnick and J.J. Donovan. Operating Systems, McGraw-Hill Book Company, New York (1974).

FN15. Ibid.

FN16. U.O. Gagliardi, "Trends In Computing System Architecture," Proceedings of the IEEE, Vol. 63, No. 6 (June 1975).

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Machine process:

Consonant with the definitions of virtualization and the hierarchial view, a machine may be defined as a process requiring resources shared with the same or another nested machine level which may also be conveniently discussed as a process. It is convenient to think of a machine as a process because during its functioning, i.e., the performance of its unique operations, it is a processor. The ultimate test of its physical characterization as a machine is whether or not unique circuit interconnections within the innermost level or bare machine are defined during the time interval in which the machine exists. The term machine process is quite distinct from mathematical process and is, in fact, equivalent to the term effective procedure for machine control.

Effective communication of these highly complex concepts is more nearly contextual than semantical, and the requirement that a context be considered increases as it is determined what is to be "seen" by larger and larger numbers of Empiricists. Technically accurate alternative modes of expression are required for describing this new category of machines which may be viewed alternatively as control mechanisms, or nested machines, or machines performing operations defining machine processes which are physically realizable only through unique interconnections of circuits, thereby suggesting that the first two characterizations are the more technically accurate, and the third the more convenient. The historical ***19** development of these modes of expression as defined herein is well-documented. [FN17]

FN17. A.S. Noble, Jr. "Design of An Integrated Programming and Operating System. Part I. System Considerations and the Monitor.", IBM Systems Journal, Vol. 7, No. 2 (June 1963), pp. 153-161; Master Control Program Characteristics, B5500 Information Processing Systems Bulletin 5000-21003, Burroughs Corp. (May 1962); W.H. Desmonde, Real-Time Data Processing Systems: Introductory Concepts, Prentice-Hall, Inc., New Jersey (1964); E.W. Dijkstra, "Solution of a Problem in Concurrent Programming Control". Comm. ACM, Vol. 8, No. 9 (September 1965), p. 569; N. Wirth, A Note on "Program Structures for Parallel Processing" Comm. ACM, Vol. 9, No. 5 (May 1966), pp. 320-321, (letter to the editor); E.W. Dijkstra, Cooperating Sequential Processes (Preliminary Version), Mathematics Department, Technological University, Eindhoven, The Netherlands (September 1965); D.W. Knuth, Comm. ACM, Vol. 9, No. 5 (May 1966), pp. 321-322 (letter to the editor); J.B. Dennis, "Segmentation and the Design of Multiprogrammed Computer Systems", Journal ACM, Vol. 12, No. 4 (October 1965), pp. 589- 602: B.W. Arden, B.A. Galler, T.C. O'Brian and F.H. Westervelt, "Program and Addressing Structure in a Time-Sharing Environment", Journal ACM, Vol. 13, No. 1 (January 1966), pp. 1-16.

4. An Explanatory Paradigm

Fig. 1

***20** The paradigm shown in Fig. 1. is an hierarchical structure [FN18] consonant with the hierarchial view, providing a visual conceptualization of nested machines. There is a virtualization looking from the outermost rings of the diagram inwardly, and looking from the innermost rings outwardly. By our definitions, the Empiricist is typically the one whose requirement is to have a very complex device's resources

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or components arranged in virtualized subsystems, while the Systems Architect, charged with the responsibility of virtualizing, would most conveniently view the program machine to be combined with his machine as a machine process (Level 4 in Fig. 1). The integrated (nested) machine with no User Process at Level 4 has no function whatever. It is a general purpose digital computer, i.e., it is only capable of being defined as a machine having a specific purpose by the machine specification of the Empiricist. No specific machine exists absent a User Process defined by the the machine specification. To the extent that the User Process has any relation to a traditional definition of process, by logical exclusion it would have to be a process for utilization of the remainder of the machine, which is equivalent to a process for sequentially defining circuit interconnections at Level 0 in Fig. 1. The aspect of the Systems Architect's work termed "looking out" addresses itself to the organization of the general purpose digital computer so that it is virtualized in an hierarchical structure facilitating the implementation phase of the Empiricist's work. A simple way of viewing this aspect is to define the innermost virtualized machine as the Central Processing Unit in combination with a facility for defining time intervals for effective procedure execution, i.e., controlling access to the various facilities consonant with the machine specification. The innermost machine facilities are thus sequentially shared by the outermost machines. This time slicing is performed by a timing mechanism for defining when the outermost machines in Fig. 1 are to have their instructions decoded in a manner defined by the Systems Architect to exercise the most general control over the innermost machine's components or subsystems in an optimum manner.

FN18. Dijkstra, supra note 12.

***21** In the paradigm of Fig. 1, "looking out" from Level 0 to successively higher levels is merely an organizational view of general structure that will behave in a generally predictable manner perceived by the Empiricist "looking in". To relate this to the earlier discussion, "looking out" is defining how the circuits might be interconnected as a general proposition to facilitate optimum utilization by the program machine or special purpose digital computer designer; "looking in" is determining the shallowest penetration that will be adequate to an understanding of the structure sufficient to design the new machine. Levels 0 and 1 are generally referred to as the resident nucleus. The simplest model of the resident nucleus includes (a) the Central Processing Unit, (b) the timing mechanism, (c) the main memory and (d) the most basic management of the three. The Systems Architect would normally consider the resident nucleus as exclusively within his province. The Empiricist typically designs a machine working at all levels higher than Level 1. The Systems Architect's manifold tasks include organizing and structuring the various components of the general purpose digital computer to perform optimally as the nucleus for the largest number of Empiricists desiring to structure either an enhanced general purpose digital computer or a special purpose digital computer, and communicating the organization and functioning of the nested machines to the Empiricist in a manner best suited to facilitate the accomplishment of the Empiricist's task.

Any Empiricist works with a machine of a given description to structure a new machine. Certain Empiricists would treat more with applications problems derivative from the industrial environment, and others more with systems problems defined by the functional characteristics of the original machine. This is the principal reason

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why the Systems Architect chooses alternative modes of ***22** expression of the original machine's virtualization [FN19] to make the full capabilities or resources available to those "looking in" to any desired depth.

FN19. Typical examples of a Systems Architect's Virtualization of the modern general purpose digital computer to communicate its attributes to Empiricists, which examples demonstrate that by "looking in" one's perception would be that successive levels define "nested machines", are found in the following collection of one manufacturer's publications:
IBM System/360 Disk Operating System, System Control and Systems Service Programs, Form C24-5036-3.
IBM System/360 Disk and Tape Operating Systems, Assembler Specifications, Form C24-3414.
IBM System/360 Disk Operating System Supervisor and Input/Output Macros, Form C24-5037.
IBM System/360 Disk Operating System, Data Management Concept, Form C24- 3427.
IBM System/360 Principles of Operation, Form A22-6821.

5. The Technological Equivalence of Hardware, Firmware, and Software.

Advances in the state of the art of machine implementation are constantly changing the boundary between the soft and nonsoft portions of the generalized computer system. [FN20] Computer system architecture is the collection of the various layers of basic elements or building blocks composing a computer system in their nesting relationship and with the media of implementation. The media of implementation are: (1) hardware or built-in logic, viz., the actual circuits which have the inherent capability of being interconnected to direct signals and combine them in a manner similar to the exercise of logic; (2) firmware, i.e., procedures coded in a control store affording greater speed and ease of modification than hardware, but less than software; and (3) software, i.e., procedures coded in an easily alterable main storage memory. Determining the proper media mix is a critical part of the System Architect's task, since it affects the key tradeoff, viz., ease of maintenance versus cost/performance.

FN20. Gagliardi, supra note 16.

***23** The procedures coded in the various media are effective procedures for specifically directing and combining signals in a code having the representation 1 0 1 0 1 .....meaning ON OFF ON OFF ON ..... The software medium is more easily alterable than hardware or firmware, just as it is easier to turn on the lights than to pursue the setting sun. What is embodied in the software medium is an implementation of a machine solution, designed in a manner most readily realized physically. This says nothing about its ease of design. Ease is a relative term in an engineering or scientific context, just as in a more general context. In order that anything of value be accomplished by the general purpose digital computer, thousands of switches must be turned ON or OFF during substantially the same time frame of reference. The time frame of reference is on the order of millionths or even billionths of a second. A code precisely the same as that described above is used to control the setting of the multitude of switches. These ***24** switches reside in a plurality of circuits or arrangements of such circuits, which are defined by the setting of the switches. [FN21]

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FN21. U.S. Patent No. 3,500,062 discloses an exemplary logic circuit which is, generically, an inverter, but provided with a plurality of elements contained therein having the inherent capability of instantaneously changing states, i.e., switches. The switch settings are eached defined logically as either O = OFF or I = ON at any given time, there being an additionally provided master switch which would best be defined as a theoretical switch, not being integrally a part of the circuit but rather being a signal serving as one of the inputs thereto. The circuit is of interest in that it is a basic building block of the general purpose digital computer, adaptable as the functional equivalent of either an EXCLUSIVE OR useful in performing arithmetic or an EXCLUSIVE OR (the logical complement) useful as a conditional logic circuit. Concerning the circuit, all of the following statements are true.
(1) Each and every switch may be set bv any of the implementation media a) hardware; b) firmware; or c) software.
(2) All of the inputs and outputs are the logical voltage equivalents of 1 or 0. (3) The operation of the circuit is "virtualized looking out" to the extent that the source of the input signals is a matter of complete indifference.
(4) Additional circuits precisely the same as the one disclosed could be grouped almost indefinitely to define a substantial portion of the "bare machine", for all of which each of the first three statements could also be made. The output of such circuits could provide the inputs to other identical circuits, as, for example, in a multi-stage adder.

The running program therefore defines, in sequence, a great number of unique circuits. Thus, although program software is often called "instant hardware" [FN22] , it is more appropriately termed "instantaneously-defined hardware combinations collectively suitable for specifying a new machine whose operational functionality is appropriate to implementing a machine solution to a machine problem to be solved." Defining the appropriate mix of implementation media may be a continuing process, even for a special purpose digital computer already ***25** designed and functioning. The three media are, as a matter of technological fact, interchangeable and therefore functionally equivalent. [FN23]

FN22. J. Scafetta, Jr., "Computer Software Protection: The Copyright Revision Bills and Alternatives", The John Marshall Journal of Practice & Procedure, Vol. 8, No. 3 (Spring Term, 1975), p. 383.

FN23. J. Allen, "Computer Architecture For Signal Processing", Proceedings of the IEEE, Vol. 63, No. 4 (April 1975).

Exemplary of the equivalence functionality of the alternative media is Digital Signal Processing [FN24], a precise science requiring certain architectural insights and most readily understood by examining the environment within which the machine problem to be solved arises. The term itself may be accurately defined as directing and combining signals arriving from an external environment in such great number and at such a high rate that no matter how complex their combination, it must be accomplished at an extraordinarily high rate, as though the signals were being merely processed, a term often applied in a context wherein the combinations may be readily accomplished over a relatively short time frame, making time for combining signals a secondary constraint. Thus, digital signal processing machines are within

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the genus of real time machines, i.e., machines which process data almost as fast as it is received to produce correlated output signals.

> FN24. Ibid. at p. 624: "In recent years, however, many studies have revealed structural aspects of digital signal-processing tasks which could be exploited in hardware design. As a result, there have been a number of hard-wired and programmable machines constructed which provide large speedup over general purpose processors, and which often also reduce the cost of the calculations."

Digital signal processing was originally accomplished with analog computers because of their inherent characteristic that, once a particular machine is properly designed and structured, solutions are available virtually instantaneously responsive to input signals, and because inefficiencies in operation of early models of digital computers contraindicated their choice. As the speed and efficiency of general purpose digital computers improved, the functional equivalents of the analog machines were designed and implemented as special purpose digital computers, the functionality of the digital machine being defined principally by program software. These machines yet proved to be too slow to be economical.

***26** As new digital technologies were developed, e.g., improvements in the switches, particularly speed-up of their inherent capability for changing states, it was observed by the Systems Architects that the critical functions might best be moved from Level 4 to Levels 0 and 1 in Fig. 1. This shifting of functions was implemented by designing new codes and a means (firmware) for their interpretation or, alternatively, by permanently wiring certain functions. Thus, all means for defining functionality in adapting a digital computer to the solution of a specific problem are interchangeable, and all such means define structure.

6. Higher Level Languages As Definitions of Machines Defining Alternative Modes of Implementation.

The development of higher level algorithm coding languages such as FORTRAN and ALGOL is typical of the work of the Academician, responding to what is called application pull, viz., the influence of real-world problems on the sequence of technical development. With the perception that the general purpose digital computer had a broad spectrum of possible end uses to which it might be adapted, there developed a requirement for making these machines more readily accessible to members of the scientific community whose interest, at an introductory or entry level of their work with these new general purpose machines, was more in translating formulae (algorithms) with relative ease than in optimizing design of the special purpose machines tailored to the solution of their problem. The intermediary between the conceptualizing individual treating principally with formulation of an algorithm in an industrial context and the particular general purpose machine sought to be adapted to that context is the Academician who abstracts the characteristics of the original machine and formulates near-optimum translation algorithms for carrying the problem formulation algorithm into effect, i.e., into an implementation or effective procedure for machine control. The intermediate procedure requisite to this mode of implementation of the machine solution within the industrial context of interest is called compilation, ***27** which is accomplished under the machine control of a compiler such as FORTRAN. The result of this intermediate step, i.e., the effective procedure for machine control, rarely matches the result that obtains from the step-

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by-step optimum design of the special purpose machine by one more knowledgeable of the details of the general purpose machine. In short, some effective procedures are more effective than others. [FN25]

FN25. The development of special purpose program machines adequate to the task of converting the higher level languages, defined simply as symbolic codes capable of expressing the algorithm as a purported effective procedure in a manner reducing greatly the steps of the coding task, has continued over a period of many years. The history of the task of expanding the codes into suboptimal step-by-step operation codes for defining circuit interconnections which are merely purported effective procedures can be traced by reference to the following:
R.W. Floyd, "Syntactic Analysis and Operator Precedence", Journal ACM, Vol. 10, 3 (July 1963), pp. 316-333.
J. Eichel, M. Paul, F.L. Bauer and K. Samelson, "A Syntax-Controlled Generator of Formal Language Processors", Comm. ACM, Vol. 6, 8 (Aug. 1963), pp. 451-455.
N. Chomsky and M.P. Schutzenberger, "The Algebraic Theory of Context-Free Languages", Computer Programming and Formal Systems, North-Holland, Amsterdam (1963).
B. Randall and L.J. Russell, ALGOL 60 Implementation, Academic Press, New York (1964).
E.T. Irons, "Structural Connections in Formal Languages", Comm. ACM, Vol. 7, 2 (Feb. 1964), pp. 67-72.
N. Wirth, "Find Precedence Functions Algorithm 265", Comm ACM, Vol. 8, 10 (Oct. 1965), pp. 604-605.
N. Wirth, H. Weber, "Euler -- A Generalization of ALGOL And Its Formal Definition." Part I, Part II., Comm. ACM, Vol. 9, 1 (Jan. 1966), pp. 13-23, 25 and Vol. 9, 2 (Feb. 1966), pp. 89-105, 107.
The first FORTRAN compiler required that an IBM 701 be adapted five distinct times to perform what are referred to as passes to produce suboptimally arranged operation codes for machine designers desiring to adapt the IBM 701 to their machine problem to be solved. This work commenced in 1952 and terminated in 1954. The technique was termed heuristic by W. Rutishauser, a word deriving from the German verb heuriskein, to invent by empirically determining alternatives. Webster's New World Dictionary of The American Language, Second College Edition (1972).

***28** The evolution of a higher level language or, equivalently, translation algorithm, makes it clear that any such language or algorithm must have an efficient physical realization for carrying out an effective procedure for translation. The relationship of translation algorithm (higher level language) to translation effective procedure (implementation of the higher level language) is precisely the same as the relationship of an algorithm descriptive of an industrial context to an effective procedure for machine control within that industrial context. In fact, a translation algorithm must become a translation effective procedure, because in order that it be commercially viable as a machine, its functioning to carry a source industrial algorithm into its related object industrial effective procedure must be such that the operations defined for that object industrial effective procedure as well as other object structural definitions formed during compilation, e.g., shared facilities of the general purpose machine, must be more nearly optimal than competitive alternatives.

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Typically, one utilizing the facilities of the enhanced or extended machine defined to compile his industrial algorithm over a period of time, and absent a requirement or the interest to "look in" to a greater depth, will avail himself of the best features of that machine. Thus, during the course of his preparation for carrying his industrial algorithm into an effective procedure for machine control, he is concerned with implementation, viz., getting the program machine which defines the effective procedure onto the general purpose machine to define a machine solution to the machine problem to be solved.

The extended/enhanced machine which is used for each and every step of compilation is a machine distinct from that which is to be structured by the fully-tested effective procedure. It is a machine for assisting a machine designer in the design of another machine. In the fully-formed machine, conceived as a distinct industrial algorithm and reduced to practice as a distinct industrial effective procedure for machine control, such control is achieved by hundreds of thousands of unique sequential interconnections of circuits. Thus, a general purpose machine, adapted as a compiler by an Academician ***29** responding to application pull, is more like an automatic machine for stamping printed circuits or an automatic lathe for machining parts than a translator of languages as asserted by petitioner (Pet. Br. 29).

The work of the Academician whose activities are within the second cycle, supra p. 16, may be described as axiomatic investigation, i.e., seeking a suitable axiomatic structure to define the physical structure of the various machines performing myriad complex computations to provide machine solutions within an ever-expanding industrial context. The search for appropriate techniques of axiomatic investigation is a continuing one. This type of investigation is of a unique character, in that it employs non-numerical mathematics. [FN26] This uniqueness is ***30** reflected by the work of the many pioneers who have defined the nexus between the various techniques of axiomatic investigation. [FN27]

> FN26. See Minsky, supra note 7, Preface, p. x:
> "This really is a branch of mathematics that stems directly from non-numerical, logical foundations ...
> "It is worth a few words to try to explain why classical mathematical analysis plays such a small role here. In developing a Theory of Computation we are trying to deal with systems composed of a great many parts, or very intricate structures (emphasis added) ....Now it is true that under certain special conditions mathematical analysis can 'revive' as it were, when the situation gets complex in such a way that the parts of the system can be treated as individually and independently random ... But it must be stated explicitly and emphatically that this is just what does not happen when, as in a computation system, the structure has a more organized, purposeful structure ... There simply is no reason to suppose that as computations grow large, one will discover anything non-trivial by trying to 'average out' the effects of many events. The effect of the conditional is too strong ...
> "Fortunately, the systems of computation have other features that make possible some analysis, though a very different kind ... we use logically defined classes of computations or expressions. They are tied together not by geometric or energetic properties, but by their relations to similar machines or similar definitions ..."

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FN27. The following are exemplary of pioneer works defining adaptable theoretical structure employing the axiomatic technique, i.e., statements of propositions whose truth would be accepted within a framework of the logic of propositions respecting the description of machines not then in existence: Turing, supra note 5; S.C. Kleene, "General Recursive Functions of Natural Numbers," Math Annalen, 1936), pp. 112, 340-353; A. Church, "The Calculi of Lamda-Conversion", Annals of Mathematics Studies, Princeton (1941); E.L. Post, "Absolutely Unsolvable Problems And Relatively Undecidable Propositions -- Account Of An Anticipation", M.S. unpublished, 1941, formally published, M. Davis, The Undecidable, Raven Press, Hewlett, N.Y. (1965); E.L. Post, "A Variant of A Recursively Unsolvable Problem," Bull. Amer. Math. Soc., Vol. 52 (1946), pp. 264-268.

7. Summary

Invention in the program machine art may reside in conceptualizing a machine with the state of the implementation art in view, in reducing an abstraction to practice in the form of an implementation, or in any of the activities distributed over the various steps of the inventive process, according to the magnitude and complexity of the machine problem to be solved. The technological facts present a logical imperative, viz., that a new program defines a new machine which is either an extended or enhanced general purpose machine such as that of Amicus Universal or a special purpose machine such as that disclosed and claimed in respondent's application. Such new programs which meet the standards set by 35 U.S.C. § § 102, 103 should be afforded patent protection [FN28] under that statute, particularly in view of the ***31** unsuitability of both trade secret [FN29] and copyright protection. [FN30]

FN28. Even the Solicitor General has publicly acknowledged that "the dynamic interrelationship between ... computers and the software programs through which they are applied to numerous and varied tasks may call for new measures or legal concepts to further reward and stimulate innovation in programming." Computerworld, Vol. IX, No. 33 (August 13, 1975), p. 3.

FN29. Scafetta, supra note 22, pp. 395-6. Also see Computerworld, supra note 28, p. 3, the comment by G. Chatfield on the near-impossibility of maintaining secrecy of proprietary software:
"When a main storage dump is taken, [the software vendor's] code lays in object form in that system. Anyone who is very knowledgeable knows you can do a fairly decent job in 'reverse translating' to get back to at least a pseudosource language. This more or less reveals the concepts, patterns and ideas of the vendor's software."

FN30. Scafetta, supra note 22.

C. An Unobvious Idea Can Form A Sound Legal Basis For Patentability Even Though Its Implementation Is Obvious Once The Idea Has Been Grasped.

Petitioner has asserted that even where an idea [FN31] is not obvious, its implementation must be unobvious as well in order to justify the grant of Letters

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Patent, whether the implementation involves a process or a product (Pet. Br. 11-12, 22). Paraphrasing the foregoing proposition, petitioner has further asserted that the patent laws require not only the application of the unobvious idea to a new and useful end, but also the exercise of the inventive faculty in both conceiving and devising the end product or process (Pet. Br. 22-23). With these dangerously broad assertions, petitioner threatens a carefully-developed principle which has been firmly established in our patent law by a series of soundly-reasoned judicial decisions handed down over a period of nearly 75 years. This principle may be stated as follows: if a problem is unobvious or the source of a known problem is unobvious, and an inventor has recognized the existence of the unobvious problem or the unobvious source of the known problem, and has conceived and reduced to practice a new product (article, machine, composition of matter) or process which solves the problem, then that inventor may obtain patent protection for the new product or process, even if that product or process is an obvious solution to the unobvious problem after that problem has ***32** been recognized, or is an obvious solution to the known problem after its unobvious source has been recognized. Hobbs v. Beach, 180 U.S. 383, 392-3 (1901); Eibel Process Company v. Minnesota & Ontario Paper Company, 261 U.S. 45, 67-68 (1923); General Electric Company v. Hartman, 187 Fed. 131, 135-6 (1st Cir. 1911); Application of Hamilton, 64 F.2d 141,143 (C.C.P.A. 1933); Application of Hofmann, 95 F.2d 257, 259 (C.C.P.A. 1938); Application of Bencker, 96 F.2d 326, 328 (C.C.P.A. 1938); Application of Deakins, 96 F.2d 845, 849 (C.C.P.A. 1938); Application of Earle, 102 F.2d 232, 235 (C.C.P.A. 1939); Application of DeLancey, 159 F.2d 737, 741 (C.C.P.A. 1947); Application of Emmey, 161 F.2d 754, 756 (C.C.P.A. 1947); Application of Holt, 162 F.2d 472, 477 (C.C.P.A. 1947); Application of Bisley, 197 F.2d 355,363 (C.C.P.A. 1952); Application of Tanczyn, 202 F.2d 785, 787 (C.C.P.A. 1953); Application of Shaffer, 229 F.2d 476,480 (C.C.P.A. 1956); Application of Pennington, 241 F.2d 750, 754 (C.C.P.A. 1957); Application of Hortman, 264 F.2d 911, 913 (C.C.P.A. 1959); Application of Antonson, 272 F.2d 948, 949 (C.C.P.A. 1959); Application of Conover, 304 F.2d 680, 683-4 (C.C.P.A. 1962; Application of Linnert, 309 F.2d 498, 501-2 (C.C.P.A. 1962); Application of Sponnoble, 405 F.2d 578, 585-6 (C.C.P.A. 1969); Trio Process Corp. v. L. Goldstein's Sons, Inc., 461 F.2d 66, 72 [footnote18a] (3rd Cir. 1972), cert. denied 409 U.S. 997; Application of Roberts, 470 F.2d 1399, 1401 (C.C.P.A. 1973); Application of Nomiya, 509 F.2d 566, 571-2 (C.C.P.A. 1975). This principle has been applied not only in decisions by the Courts, but also in administrative decisions by the Patent Office. Ex parte Phair, 1 U.S.P.Q. 133, 134 (P.O. Bd. App. 1929); Ex parte Greider, 17 U.S.P.Q. 73 (P.O. Bd. App. 1932; Ex parte Denny, 65 U.S.P.Q. 523, 524 (P.O. Bd. App. 1944); Ex parte Harr, 73 U.S.P.Q. 120, 121 (P.O. Bd. App. 1946); Ex parte Hemig, 125 U.S.P.Q. 75, 76 (P.O. Bd. App. 1959); Ex parte Ligh, 159 U.S.P.Q. 61, 62 (P.O. Bd. App. 1967); Ex parte Breidt, 161 U.S.P.Q. 767, 768 (P.O. Bd. App. 1968). Thus, the ***33** particular manifestation of invention [FN32] in which the idea or mental aspect is the crucial element from which the remaining elements obviously flow has consistently been found to be a patentable contribution to the useful arts.

FN31. "Idea" is defined as any conception existing in the mind as a result of mental understanding, awareness, or activity. The Random House Dictionary of the English Language (Unabridged Edition) (1966).

FN32. Three classes of invention are defined in Rosemary Mfg. Co. v. Halifax Cotton Mills, 257 Fed. 321 (4th Cir. 1919) as follows: "In many inventions there are two distinct steps: First, the conception of the general result

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> wished for; second, the discovery of a way of obtaining it. In a large majority of cases, perhaps the first may be obvious to every one interested in a particular art, and it is the second which calls for the exercise of inventive genius. But that is not always so. It may well be that two or more machines, appliances, or tools are old and well known. Some day it dawns on someone that, if they are combined, new and useful results will be obtained. It may be that, so soon as the advantages of the combination are understood, the means of bringing it about are within the capacity of any fairly skilled mechanic. In a third class of cases inventive genius may be required both in perceiving the combination that is desirable, and in finding out a practical way of making it."

The contrary proposition and the various paraphrasings thereof by petitioner are said to be precedented by Gottschalk v. Benson, supra, but the cited portion of that decision (67-68) speaks only of a requirement for the application of a newly-discovered law of nature to a new and useful (but not unobvious) end as a prerequisite to issuance of a patent based on the discovery. Thus, petitioner appears to have indulged in an unwarranted extrapolation of Benson. Also cited is Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127 (1948), in which product claims drawn to an inoculant for leguminous plants formed by combining mutually non-inhibitive strains of different species of bacteria were held invalid because they were found to be based on the newly-discovered law of nature that certain bacterial strains did not inhibit each others ability to fix nitrogen in specific leguminous ***34** plants, [FN33] not because they were based on an idea. Armour Pharmaceutical Co. v. Richardson-Merrell, Inc., 396 F.2d 70 (3rd Cir. 1968) dealt with product claims drawn to an enterically-coated oral dose of trypsin for systemic treatment of inflammation, the enteric coating being designed to protect the dose as it passed through the acid environment of the gastrointestinal tract until it reached the ileum, where it disintegrated permitting the release of the trypsin dose and its absorption into the bloodstream. Following Funk, and noting that the process of enterically coating medicaments was well-known, the Court held the product claims invalid because they were found to be based not on an idea, but on the discovery of the natural phenomenon that the ileum would absorb trypsin. The Davison Chemical Corp. v. Joliet Chemicals, Inc., 179 F.2d 793 (7th Cir. 1950) involved patent claims to a process for making silica gel of low density (and therefore high porosity) in water of higher temperature than taught by the prior art. The utility of the silica gel as a dessicant was thereby enhanced in certain applications. The Court held the claims invalid, not because the invention derived from an idea, but because it was based on the newly-discovered scientific fact that the temperature of the washing water directly affects the density of the silica gel. In National Lead Co. v. Western Lead Products Co., 324 F.2d 539 (9th Cir. 1963), the Court followed Davison in affirming the District Court decision invalidating claims to a process for continuously producing ***35** a mixture of different types of lead, even though the process yielded superior control over the particle size, composition, and color of the mixture by restricting the mixing pot temperatures to a defined range. The Court found that the invention was based on the discovery of a natural relationship between the temperature of the reaction and the uniformity of product characteristics. In Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 174 F.2d 547 (1st Cir. 1949), cert. denied 338 U.S. 822, the structure of a drive-in theatre was acknowledged to be appropriate subject matter for a patent, but was found to be obvious as claimed, without giving any weight to the method of doing

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business in which that structure was intended to be instrumental.

> FN33. Mr. Justice Frankfurter, concurring in this result on the separate ground of inadequate disclosure, said: "If this is a correct analysis of Bond's endeavors two different claims of originality are involved: (1) the idea that there are compatible strains, and (2) the experimental demonstration that there were in fact some compatible strains. Insofar as the court below concluded that the packaging of a particular mixture of compatible strains is an invention and as such patentable, I agree, provided not only that a new and useful property results from their combination, but also that the particular strains are identifiable and adequately identified."
> Mr. Justice Burton and Mr. Justice Jackson, dissenting, agreed with Mr. Justice Frankfurter that the patentee's combinations of mutually non-inhibitive strains of bacteria satisfied the statutory requirements of invention.

Since only Loew's involved an invention which appears to be based upon an idea, and that relating to a method of doing business rather than a scientific or technical insight, petitioner's sweeping proposition is only narrowly supported by one case. It is noteworthy that the legal basis for the later decisions (except Loew's) derived largely from Funk, in which this Court was sharply divided. [FN34] In any event, all of these cases may be distinguished from those cited by Amicus Universal in that the discoveries in the latter cases were in a specific technological context, i.e., they were discoveries of deficiencies or problems or the sources of problems in the prior art, rather than discoveries of scientific principles per se. On this basis, it is urged that petitioner's excessively broad statement of what Benson, Funk, Armour, National Lead, Davison, and Loew's stand for be rejected so as to leave intact the soundly-reasoned body of law cited by Amicus Universal.

> FN34. Concerning the analysis in Funk, Mr. Justice Frankfurter, in his separate concurring opinion, supra, note 33, observed that:
> "It only confuses the issue, however, to introduce such terms as 'the work of nature' and the 'laws of nature', for these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed 'the work of nature', and any patentable composite exemplifies in its properties 'the laws of nature'. Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent."

***36** To the extent that the few decisions cited by petitioner might be deemed to be inconsistent with the great weight of contrary authority cited by Amicus Universal, it is urged that the latter is more in keeping with the concept behind our patent system, viz., rewarding those inventors who make the knowledge of their technological advancements available to the public. An inventor who has made a contribution to the understanding of the useful arts should not be denied patent protection for an invention stemming from that understanding. To make an inquiry into the unobviousness of an invention without considering its conceptualization seems too narrow a view. Even if an invention might be readily carried out after forming its conceptualization, and even if that conceptualization begins with a newly-discovered scientific principle, the grant of a patent for a limited number of years does not seem too great a reward for the discovery and dissemination of a

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scientific principle which is eternal.

V

CONCLUSION

For the foregoing reasons, the judgment of the Court of Customs and Patent Appeals should be affirmed.

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1975 WL 173467

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• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173465 (Appellate Brief) Brief for the Respondent (Oct. Term 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

• 1975 WL 173470 (Appellate Brief) Brief Amicus Curiae for Software Associates, Inc. (Oct. Term 1975)

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END OF DOCUMENT

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents and Trademarks, petitioner,
v.
Thomas R. JOHNSTON.
No. 74-1033.
October Term, 1975.
July 31, 1975.
ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Brief for the Petitioner

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***1** OPINIONS BELOW

The opinion of the Court of Customs and Patent Appeals (Pet. App. 1A-22A) is reported at 502 F. 2d 765. The opinion of the Patent Office Board of Appeals (Pet. App. 25A-36A) is not reported.

JURISDICTION

The judgment of the Court of Customs and Patent Appeals (Pet. App. 23A) was entered on October 11, 1974. On December 12, 1974, the Chief Justice extended the time for filing a petition for a writ of certiorari to February 16, 1975 (a Sunday). The petition ***2** was filed on February 18, 1975 (February 17 having been a legal holiday), and was granted on May 12, 1975. The jurisdiction of this Court rests on 28 U.S.C. 1256.

QUESTIONS PRESENTED

1. Whether this Court's holding in Gottschalk v. Benson, 409 U.S. 63, that a new idea to be implemented by programming an existing computer is unpatentable when claimed as a new "process," also applies when the programmed computer is claimed as a new "machine system."

2. Whether programs for existing general purpose digital computers, however claimed, are patentable under present law.

3. Whether respondent's idea of having banks provide an additional bookkeeping service by programming their computers to sort check and deposit data in accordance with category codes was in any event no more than an obvious improvement over prior art.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

Article I, Section 8, clause 8, of the Constitution of the United States, provides:

> The Congress shall have Power * * *
>
> * * *
>
> To promote the Progress of Science and useful Arts, by securing for limited Times

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to Authors and Inventors the exclusive Right to their respective Writings and Discoveries * * *.

35 U.S.C. 100(b) provides:

The term "process" means process, art or method, and includes a new use of a known ***3** process, machine, manufacture, composition of matter, or material.

35 U.S.C. 101 provides:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

35 U.S.C. 103 provides:

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

STATEMENT

Respondent applied (A. 3-85, 107-109) [FN1] for a patent on a modified system for using existing general purpose digital computers in conducting the banking business. The system permits a bank to offer checking account customers a bookkeeping service that not only provides the usual overall balance and activity statement, but also furnishes subtotals for various categories of debit and credit transactions, such as rent or ***4** fuel payments, sales income or dividends received, etc. Under respondent's system, the customer labels each check (or deposit slip) with an appropriate category code that designates the type of transaction. The bank records this category code on the check (or deposit slip) in magnetic ink characters and stores the category data in the memory of the bank's computer, along with the other data normally associated with the transaction. [FN2] At the end of the monthly statement period, the bank's computer sorts the customer's transactions according to category codes, and causes information concerning each transaction and a subtotal to be printed out for each category (Pet. App. 3A-7A). [FN3] Respondent stated that his "invention is being sold as a computer program to banks * * * so that they can perform these data processing services for depositors" (id. at 19A).

FN1. "A." refers to the printed Appendix. "Pet. App." refers to the appendix to the Petition for a Writ of Certiorari. "Br. in Opp." refers to the Brief in Opposition to the Petition.

FN2. According to the patent application, banks use digital computers "for the handling of much of the record-keeping operations involved in a banking system" (A. 3). Typically, checks and deposit slips carry the following information (among other data) in magnetic ink (or other machine-readable) characters printed on them: customer's account number, amount of the transaction, and whether the transaction is a deposit (credit) or check (debit). This information is printed in magnetic ink to facilitate the processing of such data by the bank's computer. Respondent's system adds another such item: the code for the transaction category (rent payments, etc.), so that the computer can process this item along with the others (A. 4-5).

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FN3. The result is analogous to the customer's writing "rent," "fuel" or the like on each check as he draws it (or similarly marking each deposit slip) and, upon receipt of each monthly statement, sorting out the cashed checks and the deposit slips in each category into separate piles and adding up the subtotal for each pile.

***5** The patent application (see A. 3-85) describes the necessary steps in the operation, contains flow diagrams for the operation of this type of program, and gives as an example a specific program for use on the IBM 1400 series general purpose digital computer. Respondent sought to patent the system both as a "process" and as a "machine system" or apparatus. [FN4] A typical "machine system" claim, set out in the opinion of the court below (Pet. App. 5A-7A; see A. 107-109, in addition to describing the usual operations of such a computer, provides in substance:

FN4. As used in patent law, the terms "machine" and "apparatus" are synonymous.

A record-keeping machine system for financial accounts, said system comprising a data processor (such as the IBM 1400) including the usual components, and having means for processing category-coded transaction data to compute subtotals for each category, as well as means for producing an output record of each category's subtotal.

The patent examiner rejected all the claims as being anticipated by prior art and hence unpatentable under 35 U.S.C. 102 (see A. 89-91) and for other reasons. [FN5] Respondent appealed to the Patent and Trademark Office Board of Appeals, which did not adopt all of the examiner's grounds for rejection, but instead rejected the claims on new grounds (pursuant to 37 C.F.R. 1.196). It said that the claims ***6** were "not directed to improve record keeping machinery, but rather to a broad system of keeping financial records where the distinction over acknowledged prior record-keeping is either in the identity of the * * * institution which has custody of certain phases of the bookkeeping operation or in * * * the relationship existing between the various records," and that the claims thus do not "spell out * * * any particular configuration of business machinery" (Pet. App. 29A). Such claims do not define a patentable "machine," the Board stated, because the invention, if any, is only in the meaning (rent account, dividend account, etc.) given by the user to the pattern of electrical signals stored in the computer's memory. A preexisting computer performing with a particular program does not become a different machine merely because the user has assigned different meanings to various sections of its memory. [FN6] As the Board explained (id. at 30A):

FN5. The examiner also found respondent's claims invalid under 35 U.S.C. 112 for not "particularly pointing out and distinctly claiming" what he considers to be his invention (see A. 91-92). The rejection under Section 112 is not in issue here.

FN6. The Board appears to have rejected the claims as not covering statutorily patentable subject matter on the ground that the program did not enhance the internal functioning of the machine, but was merely a process for using the computer outside the "technological arts" and hence unpatentable under prior decisions of the Court of Customs and Patent Appeals (Pet. App. 31A-34A).

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E.g., Application of Musgrave, 431 F. 2d 882, 893; Application of Foster, 438 F. 2d 1011, 1015; Application of Benson, 441 F. 2d 682, 688, reversed on other grounds sub nom. Gottschalk v. Benson, 409 U.S. 63. In so holding, the Board nevertheless recognized that under the case law as it then stood (i.e., prior to Gottschalk v. Benson, supra), as declared by the Court of Customs and Patent Appeals, "an unprogrammed, or a differently programmed, general purpose computer is [[not] the same machine as the one that would result from appellant's programming of the same or of a similar computer" (Pet. App. 28A). The Board noted that the examiner had apparently operated on the contrary "premise" (ibid.).

***7** There can be no structural or operational relationship of a computer memory with the meaning one chooses to assign outside the computer to a particular configuration of binary digits or "bits" in its memory. Although a a group of such bits is processed as an alphanumeric character within the computer this results from the physical states of the memory cells and manifestly this is unrelated to whether a series of such characters represents a stock number of a part or a sum of money, outside the computer. A computer operating with any given stored program is not a different machine simply because one chooses to denominate a section of its memory by a term descriptive of one meaning, such as a file of stock numbers rather than a file of sums of money.

The Board concluded (Pet. App. 33A) that there was "no essential difference in substance" between the "machine system" or "apparatus" format used in the claims now before this Court, and respondent's "process" claims (the format subsequently ruled unpatentable in Gottschalk v. Benson, 409 U.S. 63, under 35 U.S.C. 101). The Board stated that respondent's "machine system" or apparatus claims simply covered a conventional data processor having "'means' for performing conventional bookkeeping and accounting operations" (Pet. App. 33A). The Board therefore held that the "machine system" claims and the process ***8** claims "must stand or fall together" (ibid.), and rejected them all as involving subject matter that is unpatentable under 35 U.S.C. 101.

The Board also ruled that the claims were "obvious variations" (Pet. App. 34A) of conventional bookkeeping systems [FN7] and of a system previously disclosed in a prior patent (the Dirks patent (see A. 94–106), cited by the examiner), [FN8] and hence that they were unpatentable under 35 U.S.C. 103. [FN9]

FN7. The conventional systems to which the Board referred are multiple account systems by which banks carry "special," "trust," "escrow," or "personal" accounts and the like for a single customer. By combining totals from the statements for each of the accounts into a single statement, the bank can readily furnish the customer the same kind of data as respondent claims to do in his alleged invention (Pet. App. 34A–35A).

FN8. The Dirks patent claimed certain computer devices, but its introductory specification explained and disclosed, among other things, a cost accounting system for mercantile establishments. The Board considered it obvious to modify that system to implement respondent's idea since the most significant difference between the two systems was merely whether they were employed in stores (Dirks) or banks (respondent) (id. at 35A).

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FN9. Like the examiner (see p. 7, supra, n. 6), the Board also rejected respondent's claims "for indefiniteness in failing to distinctly point out the invention" as required by 35 U.S.C. 112 (Pet. App. 29A-31A).

Subsequent to the Board's decision, but before that of the court below, this Court decided Gottschalk v. Benson, supra, reversing the judgment of the Court of Customs and Patent Appeals in Application of Benson, 441 F. 2d 682, and holding unpatentable a claim for a "process" to be embodied in a program and used in a general purpose digital computer. In his appeal to the court below respondent initially challenged the ***9** Board's failure to follow the decision of that court in Application of Benson, supra (A. 112), but, following this Court's reversal of that decision, [FN10] he abandoned his "process' claims and pressed only his alternative "machine system" claims (Pet. App. 2A, n. 1).

FN10. Respondent had obtained in the court below a suspension of proceedings pending this Court's decision in Benson (A. 1).

The Court of Customs and Patent Appeals reversed 3-to-2, holding that this Court's decision in Benson applied only to process claims and was not "applicable" to apparatus claims (Pet. App. 14A). Because respondent's claims expressly purported to cover a "machine system," the court rejected the Board's conclusion that the application claimed subject matter that was unpatentable under Section 101 (id. at 13A-14A). Benson was also inapposite, in the court's view, because Benson's claims covered a mathematical formula or algorithm, in contrast with respondent's business or financial record-keeping system (id. at 14A). Finally, the court overturned the Board's rejection for obviousness because it did not regard respondent's alleged invention as "equivalent" to the prior art (id. at 15A-16A). [FN11]

FN11. The court also reversed the Board's rejection under 35 U.S.C. 112 (see p. 8, supra, n. 9), concluding that respondent's claims were adequately directed to a machine rather than only the relationship of a bank and its customers (Pet. App. 12A-13A).

Chief Judge Markey dissented. For him, the mere fact that differences existed between the prior art and the claimed advance did not suffice to make the advance unobvious (id. at 16A-17A).

***10** Judge Rich dissented separately on the basis of Benson (id. at 17A-22A). Respondent's invention, if any, he said, was a program to be used in an existing general purpose digital computer. That the respondent's claims were cast in the format of a machine claim ("machine system" or "apparatus") rather than a "process" claim format was immaterial, since "[e]very competent patent draftsman knows how to do that," and Benson could readily have cast his process claims in "machine system" form similar to respondent's (id. at 20A). Judge Rich stated that the "legal doctrine that a new program makes an old general purpose digital computer into a new and different machine," on which the majority implicitly relied in its opinion, was a "legal fiction" which was not helpful in deciding whether a program claimed as such a "machine" was patentable in view of Benson (id. at 19A). Since the majority's distinctions between the instant case and Benson were not "realistic" and were a matter of "form rather than substance," Judge Rich found Benson controlling and

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would have affirmed the rejection (id. at 21A-22A).

SUMMARY OF ARGUMENT

1. Despite the superficial complexity and obscurity of the language of respondent's patent application, the nature of his alleged invention is quite simple. In essence, it is the idea of having banks provide an additional record-keeping service for their checking account customers by programming existing types of general purpose digital computers to record and process ***11** a category code specified by the customer for each debit and credit transaction (e.g., "rent" check; "dividend" deposit) and to include in periodic statements a breakdown showing subtotals for each category. Respondent does not claim to have invented any new computer apparatus. Nor does he claim that the means of implementing his idea by programming a computer is inventive in itself; the idea concededly involves use and modification of standard, conventional?? programs now used by banks.

Although respondent's idea is embodied, and has been reduced to practice, in the form of a program for an existing general purpose digital computer, the asserted inventiveness lies in the idea underlying the program, not the actual preparation of the program itself. Accordingly, what respondent seeks--and what the Court of Customs and Patent Appeals awarded him--is a monopoly on the idea of using existing computers (which are inherently designed to serve a variety of data processing purposes) for certain additional somewhat different, types of applications.

2. A. The monopoly on an idea that respondent seeks is unavailable because, under established principles recently reaffirmed by this Court in Gottschalk v. Benson, 409 U.S. 63, ideas do not constitute patentable subject matter under existing law. The discovery of a new idea can be the basis of a patent grant only when the idea is embodied in a novel machine or process. In addition, such a machine or process must itself be "unobvious" and otherwise satisfy the statutory requirements for patentability. It is not enough if, ***12** once the idea was disclosed, the implementation of it in a machine or process would be obvious to anyone skilled in the pertinent arts.

B. The implementation of respondent's idea is not patentable, whether viewed as a program for a general purpose digital computer or as a computer reprogrammed for a special purpose. Since the earliest patent laws, one who invents a new use for an existing machine has not thereby been entitled to a machine patent.

Although a "process" patent is now available under 35 U.S.C. 100(b) and 101 to one who invents a new use for an old machine (if other conditions of patentability are met), respondent has abandoned his process claims and cannot rely upon them to sustain the decision below granting him a patent on his "machine" claims.

In any event, in Benson this Court held that process patents are unavailable under present law for new programs for existing general purpose digital computers.

C. Respondent's idea for programming existing general purpose digital computers does not, when implemented, produce a "new machine" or "machine system" on which respondent may claim a machine patent. If respondent's claim were sustained, any computer program that, like Benson's, is unpatentable as a process, could be recast as a "machine system" so as to be the basis for an even broader patent monopoly than

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that sought and rejected in Benson; this would, in effect, extend for the originator of the program, ***13** the patents covering such machines. To say that a reprogrammed general purpose digital computer is a "new machine" each time it accepts a program for an additional application is to elevate form over substance and to base the grant of an important monopoly right on what Judge Rich, in dissent below, correctly called "a legal fiction" (Pet. App. 19A).

If patent rights should be extended to programs or programming ideas for general purpose digital computers, then "considered action by the Congress is needed." Benson, supra, 409 U.S. at 73.

3. Even if respondent's programming idea involved patentable subject matter, the decision below awarding him a patent should be reversed because, in light of the prior art and practices of banks, his "invention" would have been obvious to one skilled in the art of devising computer programs. For example, respondent's idea is an obvious extension both of the practices of banks in maintaining separate special accounts for particular customers, and the Dirks patent, which disclosed a system of maintaining diverse accounts for varied divisions of a large enterprise.

ARGUMENT

I. INTRODUCTION: COMPUTERS, PROGRAMS, AND RESPONDENT'S CLAIMED DISCOVERY

The issues in this case are (1) whether respondent's claimed invention concerning a new use of existing general purpose digital computers constitstes patentable subject matter, and (2) whether that new use was unobvious to one skilled in the art of devising ***14** such uses. The questions are interrelated, for the determination of what constitutes patentable subject matter establishes a framework within which the question of obviousness may be assessed, and delineation of the assertedly non-obvious aspect of the claimed invention can focus more precisely the analysis of whether it involves patentable subject matter. Therefore we will begin by considering what it is that respondent claims he has invented that is sufficiently novel and unobvious to be entitled to a patent monopoly against all others who would use such computers in like fashion. Because respondent's claims are cast in not only the specialized language of patent applications but the esoteric terminology used to describe even a routine operation of a general purpose digital computer, they may be more readily explained if we first describe such computers and programs briefly.

A computer, for present purposes, [FN12] is an electronic device that, pursuant to appropriate controls, can perform specified arithmetical and logical operations so as to process data stored in its "memory" or presented as part of the "input" to the computer, and to present the results in a designated form of "output." The particular operations to be performed by a computer ***15** are governed by the state and configuration [FN13] of its electronic circuitry and other apparatus. Such circuitry can be fully built into the computer through wires and other physical elements (i.e., as part of the "hardware"), in which case, unless it is physically rewired, the computer will ordinarily serve only a specific purpose or application.

FN12. The nature of computers and computer programs was extensively canvassed in the numerous briefs of the parties and the amici in Gottschalk v. Benson, October Term 1972, No. 71-485. The issues in this case, however, do not require as deep an acquaintance with the technicalities of computer operations as did that case. For a recent and more detailed treatment of the matters

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discussed in the text, see 4 New Encyclopedia Britannica: Macropaedia 1045-1058 (15th ed. 1974).

FN13. "State" refers to the internal molecular or electronic condition of a part (e.g., magnetized in one polarity or another; charged or uncharged), while "configuration" refers to the physical location and arrangement of parts.

Alternatively, the computer may be designed so that the state or configuration of its circuitry can readily be changed without rewiring or other visible physical changes. Such changes are accomplished by the use of different "programs" which through various means (e.g., punched cards, tapes, disks) transmit instructions and data to the computer, in a code or "language" that the computer has been designed or programmed to "understand," for conversion to electronic impulses. "Digital" computers, but not "analog" computers, operate in this manner. [FN14]

FN14. While digital computers operate by counting discrete signals, analog computers operate continuously by measuring variables, and typically consist of fixed-wire apparatus that do not accommodate varied programs of instructions. About 90 percent of the computers now in use are digital computers.

Some programs, called "system software," are directed only to certain standard essential operations of the computer itself (e.g., translating, sorting) that are required to serve virtually any end use of the computer. Others, called "applications software" or "applications programs," are designed to make the ***16** computer perform specified data processing operations for particular users. It is the latter type of program that is involved in this case and is generally denoted by references to computer programs in common parlance.

A general purpose digital computer is designed to operate under a variety of different programs to perform diverse data processing operations. Flexibility is its essence. As the Court observed in Gottschalk v. Benson, 409 U.S. 63, 68, the end uses of such computers "vary from the operation of a train to verification of drivers' licenses to researching the lawbooks for precedents * * *." But such tasks are simply different uses for a machine that is specifically designed to perform a wide variety of tasks involving the processing of complex or voluminous data, in some cases implementing different applications programs virtually simultaneously. Simply put, the difference between a general purpose digital computer (with which we will be concerned hereafter), and a fixed wire computer is like the difference between a player piano and a music box, respectively.

In considering claimed inventions involving the use of existing general purpose digital computers, it is useful to focus on three successive modes of activity: (1) formulating the ultimate purpose to be served by a computer operation; (2) implementing that purpose or idea by determining what data should be stored in the computer's memory or be included in the input to the computers, and what steps the computer should be instructed to take in processing the data; and (3) ***17** translating those instructions into a special form and language that the computer can read. The term "program," while in a sense referring only to the product of the third phase, which may involve no more than a rather routine or mechanical

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operation, is also used generically to encompass the second phase as well. [FN15] In some cases, moreover, the implementation of the purpose to be served may require the use of other apparatus in conjunction with the computer.

> FN15. We do not suggest that every issue concerning the application of the existing patent laws to computer programs can and must be analyzed by reference to this tri-partite framework, although we believe that it usefully characterizes the broad range of computer programming.

Theoretically, inventiveness could be claimed for any of these steps. Thus, one might claim to have invented, singly or in combination: a new end use for a known computer, a new set of instructions to a computer to accomplish a specified operation, [FN16] a new language by which to instruct the computer, or a new device (or combination of a computer with an existing device).

> FN16. In Benson, for example, the general idea of converting from binary coded decimal numerals into pure binary numerals (a conversion used primarily in computer operations) was not claimed to be inventive, as that could previously be done without a computer by use of tables. 409 U.S. at 67. Rather, the invention claimed was the formula or program for instructing a general purpose digital computer to take specified steps to make the conversion. See id. at 64, 67, 73-74.

As we shall see, the alleged inventiveness or novel discovery supporting the respondent's claim to a patent resides only in the first, and most abstract, mode--the general idea or purpose that the computer ***18*** would be programmed to implement. This idea (rather than merely the commercially exploitable program means for implementing it, see p. 4, supra) as such is what respondent asserts to be sufficiently novel and unobvious to be patentable.

More specifically, respondent's alleged "invention" consists of the idea of having banks program and use their existing computers, through conventional programming techniques, to perform for their customers simple bookkeeping services that the customers either perform for themselves, hire a bookkeeper to perform, or else forego. The service consists of preparing balance statement subtotals for credits and debits in categories designated by the customer, such as rent payments, fuel payments, dividends received, sales income, and the like. As conceded by respondents (see p. 4, supra), the "invention" is marketed to banks in the form of an appropriate computer program, which the banks can then use on their conventional general purpose digital computers (e.g., the IBM 1400).

"Stated without artifice," [FN17] at the heart of respondent's claimed invention is the idea of including on the check or deposit slip an additional item of information--a number or letter code (see A. 9-10) designating one of several previously specified categories into which the particular transaction falls--which the bank's computer then stores and processes in essentially the same manner as it already stores and processes ***19*** other data associated with the transactions. See generally Mayer, The Bankers 119-154 (1974). As the sample check included in respondent's application indicates (Fig. 4, A. 72, reproduced below) it is as if, by adding the category code ("CAT. NO.") to the customer's account number, a series of sub-accounts were established:

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FN17. Great Atl. & Pac. Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 149.

Although respondent characterizes his invention as consisting of the "machine system" that results when a conventional digital computer is programmed to implement this idea, he does not claim to have invented a computer, nor does he claim that the program of instructions to the computer to implement the idea are themselves sufficiently inventive to be a patentable "Discovery" contemplated by the patent clause of the Constitution and by the Patent Code. Indeed, respondent's application acknowledges that a typical program would embody "known" and "standard techniques" (A. 12) and modifications of "conventional" or "ordinary" computer processing of bank accounts (A. 12).

***20** Respondent's claimed invention, therefore, is not like a novel telegraph apparatus or any other piece of tangible machinery. The "means" disclosed by respondent are those of an ordinary general purpose digital computer, as presently used by banks, with a program directing the components of the computer to sort check and deposit data into different categories in the conventional way the computer performs such tasks, and then conventionally to print out the results of the sorting operation.

II. AS A NEW IDEA FOR USING EXISTING GENERAL PURPOSE DIGITAL COMPUTERS, RESPONDENT'S CLAIMED INVENTION DOES NOT CONSTITUTE PATENTABLE SUBJECT MATTER

As we have seen, the gist of respondent's claimed invention is the idea of having banks modify their usage of existing computers so as to include and process an additional item of information (the category code) associated with each transaction in its customers' checking accounts. Thus, as is often the case with new developments in the field of computer applications, the assertedly imaginative element consists essentially of the idea of combining and relating specific types of data in a particular manner.

Now that banks generally use computers, it is unlikely that any proposal for supplying more than the most simple statements to their customers would be of practical use to banks unless it could be carried out on existing computers. Indeed, this is the fundamental premise of respondent's disclosure, as set forth in his application (A. 3). Thus, because respondent's idea, ***21** like Benson's, "has no substantial practical application except in connection with a digital computer," a patent on respondent's "machine system" would "wholly pre-empt" use of that idea and in "practical effect" would be a patent on the idea. See Benson, supra, 409 U.S. at 71-72.

But, however unobvious they may be, ideas have always constituted "nonstatutory" and thus unpatentable subject matter. What may be patentable is the specific and tangible application of novel ideas in some concrete form to a specific use, in which the idea is concretely embodied in a novel and inventive machine, article of manufacture, chemical or other physical composition, or process for making or using such machinery, manufactures, or compositions. The rationale of the rule against patenting ideas per se is that hindering the free exchange and spread in use of mathematical, scientific and other ideas by an indiscriminate grant of patent

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monopolies would obstruct, rather than promote, "the Progress of Science and useful Arts." U.S. Const., Art. I, Sec. 8, Cl. 8.

Thus, this Court stated in Benson that "[p]henomena 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; see O'Reilly v. Morse, 15 How. 62, 112-113. The same principle has been applied to business ideas, because patents on methods of transacting business would destroy legitimate competition, just as patents on scientific ideas would impede scientific progress. See Joseph E. Sea ***22** gram & Sons, Inc. v. Marzall, 180 F. 2d 26, 28 (C.A.D.C.) (denying patent on method of testing consumer product preferences). [FN18]

FN18. The federal courts have repeatedly held that ideas for methods of doing business are not patentable. E.g., Guthrie v. Curlett, 10 F. 2d 725 (C.A. 2) (method of abbreviating rail tariff schedules); Berardini v. Tocci, 190 Fed. 329, 332-333 (C.C.S.D. N.Y.), affirmed on the opinion below, 200 Fed. 1021 (C.A. 2) (system of using code messages for banking transactions); Hotel Security Checking Co. v. Lorraine Co., 160 Fed. 467, 469 (C.A. 2) (restaurant bookkeeping system). See also Conover v. Coe, 99 F.2d 377, 379 (C.A.D.C.).

For example, the idea of the self-service cafeteria like Morse's idea of transmitting information at a distance by means of electromagnetic force (see Benson, supra, 409 U.S. at 68), cannot be patented. See Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 174 F. 2d 547, 552 (C.A. 1), certiorari denied, 338 U.S. 822. No matter how novel, such ideas can be the basis for a patent, if at all, only in terms of, and to the extent of, their embodiment in a novel machine (such as Morse's telegraph apparatus or the coin-operated food dispensing machine used in certain cafeterias) or in a novel process.

Even when an idea is unobvious its implementation must be unobvious, as well, to justify the grant of a patent monopoly, whether the implementation involves a process or a product. The patent laws require that not only must there be the application of the idea to a new and useful end (embodied in a specific, tangible product or process), but the conception and devising of the end product or process must display ***23** the inventive faculty. The means or mode of implementing the idea must extend beyond the routine, conventional, or obvious applications of the idea that follow once the idea is known. See, e.g., Benson, supra, 409 U.S. at 67-68; Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130; [FN19] Armour Pharmaceutical Co. v. Richardson-Merrell, Inc., 396 F. 2d 70, 73-74 (C.A. 3); [FN20] National Lead Co. v. Western Lead Products Co., 324 F. 2d 539, 542 (C.A. 9); Davison Chemical Corp. v. Joliet Chemicals, Inc., 179 F. 2d 793, 794-795 (C.A. 7), certiorari denied, 340 U.S. 816; L??w's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., supra, 174 F. 2d at 551-552.

FN19. In Funk the patent covered a particular mixture of strains of bacteria useful in fixing nitrogen in soil, because the strains were not mutually inhibitory. The discovery that such strains existed was not inventive, because it was a natural phenomenon or principle. As for making the patented product, this was obvious "once nature's secret of the non-inhibitive quality of certain strains of the species of Rhizobium was discovered * * *", and the

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pat??ent was therefore invalid. 333 U.S. at 131-132.

FN20. In Armour the court stated (396 F. 2d at 74-75): "[T]he test of patentability of a natural phenomenon is as follows: Would an artisan, knowing the newly discovered natural phenomenon require more than ordinary skill to discover the process by which to apply that phenomenon as the patentee had done? * * * Once nature's secret that the ileum [intestine] would absorb trypsin [the enzyme] was uncovered, any artisan would have known the process of enterically coating the trypsin to enable it to pass through the acidic environment of the stomach and continue into the ileum. * * * Assuming arguendo that * * * [the patentee had discovered that trypsin absorbed in the ileum had an anti-inflammatory effect, his] application of that newly discovered principle would itself have to be inventive in order to sustain patent '93."

***24** In other words, the process or apparatus implementing a new idea must itself satisfy the conditions of patentability, in which case a patent monopoly may be granted, not on the idea, but on the inventive process or product. [FN21]

FN21. The Court of Customs and Patent Appeals has apparently taken a different view. See Application of Prater, 415 F. 2d 1393, 1405-1406, holding that an analog computer structured to implement a new idea is patentable, and not obvious, even if, once the idea is known, any skilled programmer could devise a program to carry it out on a general purpose digital computer. The decision below implicitly rests on this premise, as did the opinion of the Court of Customs and Patent Appeals in Application of Benson. We submit that that court's interpretation of the statute, to the extent that it survives this Court's decision in Benson, is erroneous and in conflict with Funk, supra, as well as the cited decisions of the courts of appeals.
It is also in conflict with the legislative history of Section 101, which reveals the rejection of a provision (H.R. 9133, § 101, 81st Cong., 2d Sess. (1950)) that would have overruled Funk and permitted the patenting of a noninventive application of a newly-discovered natural principle. See Hearings on H.R. 3760 before Subcommittee No. 3 of the House Committee on the Judiciary, 82d Cong., 1st Sess. 116-123 (1951); cf. 98 Cong. Rec. 9323 (1952) (quoted in Aro Mfg. Co. v. Convertible Top Co., 365 U.S. 336, 347, n. 2 (concurring opinion)). As this Court said in Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 531:
"* * * we should not expand patent rights by overruling or modifying our prior cases construing the patent statutes, unless the argument for expansion of privilege is based on more than mere inference from ambiguous statutory language. We would require a clear and certain signal from Congress before approving the position of a litigant who, as respondent here, argues that the beachhead of privilege is wider, and the area of public use narrower, than courts had previously thought. No such signal legitimizes respondent's position in this litigation."

***25** III. THE IMPLEMENTATION OF RESPONDENT'S NEW IDEA FOR COMPUTER USAGE IS NOT PATENTABLE

Respondent seeks a patent by reason of having devised a new use for an existing machine, the conventional general purpose digital computer. While one who invents a

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new use for an existing machine may under some circumstances be entitled to a patent monopoly, respondent's new use does not qualify for such a grant.

A. A NEW USE FOR AN EXISTING MACHINE IS NOT PATENTABLE AS A MACHINE

Since the enactment of the first patent law in 1790 (1 Stat. 109), Congress and the courts have adhered to the principle that a new use for an old machine can never be patented as a machine. See, e.g., Roberts v. Ryer, 91 U.S. 150, 157 ("It is no new invention to use an old machine for a new purpose"); Ansonia Brass and Copper Co. v. Electrical Supply Co., 144 U.S. 11, 18; General Elec. Co. v. Jewel Incandescent Lamp Co., 326 U.S. 242, 247-249; Old Town Ribbon & Carbon Co. v. Columbia Ribbon & Carbon Mfg. Co., 159 F. 2d 379, 382 (C.A. 2) (L. Hand, J.); Exer-Genie, Inc. v. McDonald, 453 F. 2d 132, 134-135 (C.A. 9), certiorari denied, 405 U.S. 1075; cf. Application of Zierden, 411 F. 2d 1325, 1328-1329 (C.C.P.A.).

Like much of American patent law, as embodied both in statutes and in decisions of the courts, this principle was first expressed by Thomas Jefferson. In his famous letter to Isaac McPherson in 1813 ***26** (cited in Graham v. John Deere Co., 383 U.S. 1, 8 n. 2, 10, n. 3). Jefferson said:

> If one person invents a knife convenient for pointing our pens, another cannot have a patent right for the same knife to point our pencils. A compass was invented for navigating the sea; another could not have a patent right for using it to survey land. A machine for threshing wheat has been invented in Scotland; a second person cannot get a patent right for the same machine to thresh oats, a third rye, a fourth peas, a fifth clover, etc. A string of buckets is invented and used for raising water, ore, etc., can a second have a patent right to the same machine for raising wheat, a third oats, a fourth rye, a fifth peas, etc.? [VI Writings of Thomas Jefferson 176-177 (Washington ed. 1854).]

He added that one of the general rules established by the patent board, of which he had been a member, was that (id. at 181)--

> a machine of which we were possessed, might be applied by every man to any use of which it is susceptible and that this right ought not to be taken from him and given to a monopolist, because the first perhaps had occasion so to apply it.

The insightful analysis Jefferson addressed to the simpler machines of his day applies with equal force to machines as complex and versatile as the modern general purpose digital computer. When the principal benefit of an existing machine lies in the versatility of its applications, no conventional use of the machine for a new purpose entitles anyone to an exclusive ***27** patent monopoly covering the machine.

B. A NEW USE FOR AN EXISTING MACHINE COULD BE PATENTABLE (IF AT ALL) ONLY AS A "PROCESS," BUT RESPONDENT HAS ABANDONED HIS PROCESS CLAIMS AND THIS COURT HAS HELD PROCESS PATENTS UNAVAILABLE FOR PROGRAMS FOR GENERAL PURPOSE DIGITAL COMPUTERS

In revising the Patent Code in 1952 (see 66 Stat. 797). Congress explicitly recognized limited patent protection for one who invents a new use for an existing machine. Thus, in Section 100(b) Congress defined "process" as including "a new use of a known * * * machine * * * " (35 U.S.C. 100(b)), while Section 101 provides that one who invents or discovers "any new and useful process, * * * or any new and useful improvement thereof, may obtain a patent therefor," subject to the other conditions and requirements of the Patent Code (e.g., novelty and non-obviousness). 35 U.S.C. 101. Enactment of Section 100(b) did not affect the established principle that a new use of an old machine is not patentable as a machine; rather, it simply

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meant that a new use could be patentable, if at all, only as a process. See Application of Hack, 245 F. 2d 246, 248 (C.C.P.A.) ("discoverer of a new use must protect his discovery by means of process or method claims and not product claims").

Respondent, however, has abandoned his "process" claims for the new use of computers involved here (see pp. 8-9, supra). As a result, he has eliminated what would have been the only possible basis for patentability of a new use of existing general purpose digital computers. Abandonment of the process claims ***28** was well-advised--and their retention would not have availed respondent here--because in Benson this Court held that a program that had no substantial practical application except in connection with a general purpose digital computer was not a patentable "process" within the meaning of Sections 100(b) and 101 of the Patent Code.

Thus, in Benson this Court reversed a judgment of the court below, which had allowed a patent monopoly over a method for using a conventional, general purpose digital computer to convert one form of numerical information (binary-coded decimal) to another (pure binary). In response to the suggestion that its decision "precludes a patent for any program servicing a computer" (409 U.S. at 71), the Court stated that it did not so hold (ibid.), explaining that it dealt only with a program for a digital computer and did not extend its holding against patentability to analog computers (ibid.). The Court concluded that "[i]f these programs are to be [made] patentable," then Congress must deal with the matter (id. at 73, footnote omitted).

While the outer boundaries of the Benson ruling may not be precisely defined (see the dissenting opinion of Judge Rich below, Pet. App. 19A), we believe that it covers the instant case. Respondent claims an idea for programming, in the ordinary way, a conventional, general purpose digital computer. At a minimum, Benson precludes patent monopolies on such programs as processes--the only relevant category--***29** regardless of the possible patentability of other types of computer programs.

The rationale of Benson is that such programs are not sufficiently removed, inventively, from the ideas they embody. The translation of an idea into a program for a conventional, general purpose digital computer no more imports patentability to the idea than does the translation of the idea from English to French or from English to Fortran (or any other computer language). Programs for use of conventional, general purpose digital computers are unpatentable under Benson, unless perhaps, at the very least, they "synergize" with the computer, so that the two co-act in an improved, new, and unobvious manner combining "ordinary elements in an extraordinary way" (Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 521) in which "the whole in some way exceeds the sum of its parts." Great Atl. & Pac. Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 152; Anderson's-Black Rock, Inc. v. Pavement Salvage Co., 396 U.S. 57, 61. Respondent's programming idea does not meet this test.

C. THE PROGRAMMING OF AN EXISTING GENERAL PURPOSE DIGITAL COMPUTER DOES NOT CREATE A "NEW MACHINE" OR "MACHINE SYSTEM" FOR WHICH A PATENT MONOPOLY MAY BE GRANTED

Respondent has attempted, by inventive semantics and a facile drafting device, to circumvent the foregoing barriers to obtaining a patent on his idea for programming existing digital computers. Thus, rather ***30** than seeking a machine patent by

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claiming discovery of a new use for an existing machine (barred by long-standing authority), he claims that an existing digital computer programmed to implement his idea is a "new machine," and rather than seeking a process patent on his idea for use of a computer (barred by Benson), he presses his claims in terms of a "machine system" consisting of the programmed computer. These efforts are without merit.

In no meaningful sense has respondent invented a "new machine" or "machine system." The only actual machine involved is the familiar general purpose digital computer, which is inherently capable of performing a wide variety of data processing tasks when so instructed through appropriate programs. If one could call such a computer, each time its program is modified, a "new machine," it would be so only in a purely linguistic or rhetorical sense, not in any pragmatic and realistic sense; it would be a "new machine" devised not by a mechanic or artisan but by one skilled in "the highly developed art of drafting patent claims * * *." Brenner v. Manson, 383 U.S. 519, 534.

The court below elevated form over substance in declaring Benson not "applicable" merely because respondent's patent application characterized his idea as a "machine system." That holding would provide a simple means for circumventing the important principle applied in Benson. As in that case, respondent's idea involves, at best, merely a new use for an existing machine, and that idea should no more be patentable ***31** when described here as a new "machine system" than when described in Benson as a new "process." As Judge Rich observed, any competent patent draftsman can readily convert claims from one format to the other (Pet. App. 20A). [FN22]

> FN22. We have set out in Appendix D to the petition (p. 37A) the typical Benson claim (see 409 U.S. 73-74) recast in respondent's "machine system" format.

Respondent contends that he has "devised a [new] single special-purpose computer" (Br. in Opp. 4). He argues (id. at 5) that his "claims per se do not raise any issue of computer programs; that they do not call for the use of a computer program in the construction of respondent's special-purpose computer," because a "wired computer-circuitry version" of respondent's program could instead be used to carry out the idea of performing the bookkeeping service, [FN23] and that, in any event, "a program inserted in a general-purpose computer creates a new machine" (id. at 6). The latter view appears to be based upon Application of Bernhart, 417 F. 2d 1395, 1400 (C.C.P.A.) (see Pet. App. 7A, n. 3). As applied to respondent's patent application, at least, such an analysis cannot withstand scrutiny.

> FN23. This contention is, however, at variance with respondent's assertion that "[t]he invention is a single practical special-purpose computer, while the prior art's impractical alternative would require many special-purpose computers, each inflexibly set to a user's particular format and procedure" (Br. in Opp. 10).

First, respondent's own description of his alleged invention, in the court below, conceded that this invention "was reduced to practice in the software form of computer programs (Pet. App. 19A)" and "is being ***32** sold as a computer program to banks and to other data processing companies so that they can perform these data processing services for depositors" (ibid). In addition, respondent's application,

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and his disclosure required under 35 U.S.C. 112, are expressly founded upon the use of existing automatic data processing equipment employing general purpose digital computers for bank record-keeping (A. 3); thus, the court below observed that the general control for the bookkeeping system, "as allegedly reduced to practice, is in the form of a software program" and that the application illustrates its use by means of a complete program and flow chart "for use with a known commercial general-purpose computer, the IBM 1400 series, to provide the special-purpose computer which forms the apparatus of appellant's invention" (Pet. App. 5A). More importantly, respondent has not claimed or disclosed a new "hardware" special purpose machine in his application. As Judge Rich recognized in dissent, respondent has proposed only a software program for use in the existing hardware of general purpose computers (id. at 19A). If respondent's invention is embodied in the program, it simply cannot encompass in any relevant way the various existing machines with which it may be used.

Second, respondent's suggested use of wired computer circuitry, instead of programming, is without substantial practical application. Respondent sells his idea to banks as a program, to use in conjunction with the banks' existing program routines for processing checks and deposits. Banks would have no interest in ***33** destroying the versatility of their general-purpose computers (often leased) by building "wired computer-circuitry versions" of the program into the machine. This is as unrealistic as the argument, rejected in Benson (409 U.S. at 71-72), that the conversion method in issue there could be of practical use in anything but a general purpose digital computer.

Finally, respondent's premise (based on Bernhart) that a program in a general purpose computer creates a new special purpose machine, is unsound. [FN24] As Judge ***34** Rich pointed out, "the legal doctrine that a new program makes an old general purpose digital computer into a new and different machine * * * partakes of the nature of a legal fiction when it comes to drafting claims" (id. at 19A). The Board of Appeals properly observed that, even assuming (as the Board did, see pp. 6-7, supra, n. 6) the correctness of Bernhart, supra, there is no structural or operational change in the physical identity of the computer simply because respondent, the bank, or the bank's customer has decided to associate a new meaning with a particular physical state of memory cells within the computer, i.e., that a particular combination of signals in a particular context is to be deemed "rent" or "dividends" (see Pet. App. 30A). Nor does a general purpose digital computer become a "different" machine simply because respondent, the bank, or the bank's customer chooses to have such an association made (see ibid.).

> FN24. Respondent contends that the Commissioner is jurisdictionally barred from challenging here the rationale of the Court of Customs and Patent Appeals. He reasons that the Board of Appeals' decision rejected the examiner's apparent premise that a particular program does not convert a general purpose computer into a different machine, and that the Commissioner could not appeal the Board's ruling (which in any event was adverse to respondent) or any statement made in the course of that ruling. We have answered this contention in detail in our Reply Brief filed in answer to respondent's Brief in Opposition. In summary, we contend that when the Board of Appeals has substituted its own rejection for the examiner's (under 37 C.F.R. 1.196(b)), a judgment of the Court of Customs and Patent Appeals

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reversing the Board's ruling (brought before this Court on a writ of certiorari under 28 U.S.C. 1256) may be considered in the light of the rationale of the examiner's ruling as well as that of the Board. Limitations imposed on the Commissioner by 35 U.S.C. 141, 142 and 144 do not restrict the authority of this Court under 28 U.S.C. 1256 to review the entire case. Brenner v. Manson, supra, 383 U.S. at 523, n. 6.
In any event, respondent's notice of appeal (A. 110-115) challenged every aspect of the Board's decision, including: the Board's application of the then-unreversed decision of the Court of Customs and Patent Appeals in Application of Benson, supra; the Board's determination that the claims did not involve patentable subject matter; its conclusion that the claims did not concern a particular apparatus or enhance its functioning; and its holding that, in substance, there was no difference between the "machine" and "process" claims, which the Board ruled would stand or fall together. Thus, the issues raised in the petition and this brief are properly before this Court, even if (contrary to our contention in the preceding paragraph) the Patent Code's provisions were held to limit the scope of this Court's certiorari jurisdiction.
Finally, this Court's decision in Benson, rendered after respondent had filed his "reasons of appeal" (A. 110), required the court below to apply Benson and permits the Commissioner to challenge in this Court its failure to do so properly. Cf. Bradley v. School Board, 416 U.S. 696, 711-721; Thorpe v. Housing Authority, 393 U.S. 268, 281.

***35** There is no basis in the Patent Code, its legislative history, or the prior decisions of this Court for this strained and unreasonable conception of identity and difference. [FN25] A new program in an old computer no more turns the computer into a "new" machine (let alone a new and unobvious one) than: putting a new piano roll into an old player piano makes it a "new" piano; putting a new recording on an old phonograph turns it into a "new" phonograph; [FN26] inserting into a "mag card" typewriter a new magnetic card coded with the text of a new letter turns the machine into a "new" typewriter; or shaking an old kaleidoscope turns it into a "new" one. In each case it is precisely the ability to perform in such varied ways that is the essence of the old machine.

FN25. Respondent's arbitrary assignment of meaning to "same" and "different" is reminiscent of Heraclitus' concept that one can never step into the "same" river twice because "different" waters will be flowing past.

FN26. Cf. Leeds & Catlin Co. v. Victor Talking Mach. Co., 213 U.S. 325. See also Mercoid Corp. v. Mid-Continent Inv. Co., 320 U.S. 661, 668.

The general purpose digital computer used to implement respondent's idea (e.g., the IBM 1400) is not respondent's creation. When the patents covering such machines expire, their subject matter will fall into the public domain. See, e.g., Scott Paper Co. v. Marcalus Mfg. Co., 326 U.S. 249, 255-256; Kellogg Co. v. National Biscuit Co., 305 U.S. 111, 117. Under the decision of the court below, however, respondent would receive, in effect, a second and further partial monopoly on "making, using, or selling" (35 U.S.C. 154) ***36** such machines, [FN27] which pro tanto would impermissibly withdraw from the public its right of "free access to materials already available." [FN28] Graham v. John Deere Co., 383 U.S. 1, 6;

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Anderson's-Black Rock, Inc. v. Parement Salvage Co., supra, 396 U.S. at 61. We do not believe that Congress intended the present patent laws to make available such a monopoly.

FN27. Indeed, since "[t]he inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not" (Roberts v. Ryer, supra, 91 U.S. at 157), respondent's claim of "machine" patent rights on programmed general purpose digital computers (as distinguished from a process claim) would seem to conflict with patents already granted to the inventors of those versatile machines.

FN28. The effect of a machine patent would be even broader than that of the process patent held unavailable by this Court in Benson, for it would grant the right to exclude others from "making" as well as "using" or "selling" the patented invention. We note that while respondent's claimed invention is directed primarily at the way in which banks can use existing general purpose digital computers, he also suggests the possibility that his idea could be used by other enterprises, such as those operating credit card accounts (A. 65).

We acknowledge that the dynamic interrelationship between general purpose digital computers and the software programs through which they are applied to numerous and varying tasks may call for new measures or legal concepts to further reward and stimulate innovation in programming. This Court recognized as much in Benson when it called upon Congress to determine "[i]f these programs are to be patentable" (409 U.S. at 73) or otherwise to be protected. But, as the law now stands, however high "a reach of imaginative ***37** ingenuity" a program for a general purpose digital computer may have demanded from its creator, it is nonetheless not patentable "because it will not be within the terms of the statute." Old Town Ribbon & Carbon Co. v. Columbia Ribbon & Carbon Mfg. Co., supra, 159 F. 2d at 382. See also Deepsouth Packing Co. v. Laitram Corp., supra, 406 U.S. at 531.

The sanction given by the court below to respondent's semantic circumvention of Benson recalls the sound conclusion of the President's Commission on the Patent System, quoted by this Court in Benson (409 U.S. at 72), that under present law--

> [i]ndirect attempts to obtain patents [on computer programs] * * * by drafting claims as a process, or a machine or components thereof programmed in a given manner * * * have confused the issue further and should not be permitted. ["To Promote the Progress of * * * Useful Arts," Report of the President's Commission on the Patent System 13 (1966).] [FN29]

FN29. That a computer program or programming idea does not qualify for a patent monopoly does not mean that it is necessarily without more limited legal protection against use by others. In some circumstances it might be entitled to copyright or trade secret protection. See Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470. See generally Bender, Computer Programs: Should They Be Patentable?, 68 Colum. L. Rev. 241, 248-250 (1968); Breyer, The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs, 84 Harv. L. Rev. 281, 340-350 (1970); Comment, Protecting Proprietary Rights of Computer Programs: The Need for New Legislative Protection, 21 Cath. U. L. Rev. 181, 191-198 (1971); Note, Copyright

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Protection For Computer Programs, 64 Colum. L. Rev. 1274 (1964).

***38** IV. THE CLAIMED PROGRAMMING IDEA IS OBVIOUS IN LIGHT OF THE PRIOR ART

Even if respondent's idea for a new use of a bank's conventional, general purpose digital computer were deemed potentially to involve patentable subject matter, it would be "obvious" to one skilled in the art of developing uses for computers, and therefore unpatentable under 35 U.S.C. 103, contrary to the ruling of the court below. [FN30]

FN30. The obviousness dispute in this case, over which Chief Judge Markey dissented, concerns the obviousness of the basic idea of associating category codes to credit and debit transactions in checking accounts, not the means of implementing that idea.

As the Board observed in rejecting respondent's claims as obvious (Pet. App. 34A-35A), banks using existing data processing equipment frequently have several accounts for each customer, denominated as "special," "trust," "escrow," "personal," and the like. Each of these terms is comparable to a "category code" as called for by respondent's claims. Although the bank may, for some purposes, regard accounts so denominated as separate accounts of the customer, the bank's treatment of the accounts corresponds to respondent's idea for using category codes. In fact, respondent merely adds the category code to the end of the account number (e.g., p. 19, supra) to create, in effect, a series of differing sub-account numbers to be used during the automatic data processing. Thus, under a different label, banks already provide a similar form of record keeping facility, since the computer, in handling a customer's separate special accounts, ***39** credits and debits the accounts and renders periodic summary statements to the customer. Respondent's printing of the summary sheets for all of a customer's special accounts on a single document, with totals for all accounts, is but an obvious extension, as a convenience the customer. [FN31]

FN31. Moreover, bank practices concerning ordinary checking accounts also embody the essence of respondent's claimed invention. Both with and without computers banks have long recorded appropriate service charges associated with debit transactions and included in the monthly statement a subtotal of that category of charges. They have also provided subtotals of all checks and all deposits. See Penney, Bank Statements, Cancelled Checks, and Article Four in the Electronic Age, 65 Mich. L. Rev. 1341, 1357 (1967).

The Board also relied (Pet. App. 35A) on the Dirks prior art patent (see A. 94-106), which discloses a comprehensive automatic data processing system to serve the varied purposes of individual departments of a large business organization. Dirks' system is especially applicable to ledger-type bookkeeping or mercantile cost accounting, and allows personalized files for localized areas of responsibiliy. Each area is assigned an account number in which transaction and balance files are kept and updated. The bookkeeping is on a cost accounting basis, such as for sales of a product. As the Board observed (ibid.), despite any superficial differences between mercantile cost accounting and bank bookkeeping, "[t]here is no fundamental difference" in the data processing apparatus or methods used in respondent's claimed invention and in Dirks' patented invention; the equipment and methods are

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necessarily the same, whether the amount ***40** debited represents the value of merchandise or the value of a check. [FN32]

FN32. The finding of the court below that the claimed invention here is not the "equivalent" of Dirks' patented invention (Pet. App. 15A) might be material in determining whether use of respondent's system would infringe Dirks' patent (see, e.g., Sanitary Refrigerator Co. v. Winters, 280 U.S. 30, 42; Westinghouse v. Boyden Power Brake Co., 170 U.S. 537, 568), or whether it is unpatentable under 35 U.S.C. 102 as having been anticipated by prior art. As Chief Judge Markey noted, however, in considering a rejection under Section 103 the question is not "[w]hether * * * Dirks discloses category codes or their equivalent * * * [but] whether the contribution of such category codes * * * is a difference sufficient to render the claimed subject matter unobvious to one skilled in the applicable art" (Pet. App. 17A).

Note, for example, the computerized accounts payable statement in Chart VIa of the Dirks patent (A. 102). The "customer" here is the cashier of the corporation, responsible for disbursing funds. The particular Item Groups are his "category numbers." Item Group 3 (e.g., Payroll) must be continuously updated and requires obvious subtallies (e.g., tax withholdings, savings bonds, charitable withholdings, automatic deposits in savings institutions, etc.). Moreover, for balance sheet purposes, an overall tally is obviously desirable.

In addition to those passages noted by the Board, [FN33] Dirks also disclosed that "the departments or other ***41** organizational users ["customers"] may retain their authority over operative file systems" (A. 105, column 23, lines 53 and 54) and that "[p]rogramming is very easy and different programs ["master subfiles"] are very easily coordinated" (A. 106, column 26, lines 49 and 50). As noted by the examiner (A. 88), respondent admits that the cited prior art general purpose computers, including that of Dirks, are capable of implementing his idea, when properly programmed. [FN34]

FN33. The Board stated (Pet. App. 35A):
Dirks discloses a comprehensive automatic data processing system for many different purposes in networks of individual departments of a large business corporation ([A. 96] column 6, line 35). This system alows personalized files for localized areas of responsibility ([A. 97] column 7, line 40). Each area is assigned an account number in which transaction and balance files are kept and updated ([A. 98] column 9, lines 21-64). The bookkeeping is on a cost accounting basis ([A. 102] column 18, line 62) such as for sales of a product.

FN34. Indeed, no new programming of Dirks' apparatus appears to be necessary, where respondent's claims 20-24 (A. 107-109) are concerned: respondent's master subfile control systems represent programs for individual customers, akin to Dirks' individual programming for corporate divisions.

The differences between respondent's idea and the content of the prior art are so slight that it would have been obvious to a person of ordinary skill in devising uses for computers by banks to have banks provide an additional bookkeeping service by using category codes. [FN35] Accordingly, the Court of Customs and Patent Appeals erred in holding respondent's idea unobvious and thus patentable. See Graham v. John

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Deere Co., supra.

FN35. Even proponents of patent protection for computer programs recognize that because of "lack of inventiveness" relatively few programs would be entitled to patents. E.g., Freed, Computers and Law--A Reference Work 303 (4th ed. 1973).

***42** CONCLUSION

For the foregoing reasons, the judgment of the Court of Customs and Patent Appeals should be reversed.

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Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173465 (Appellate Brief) Brief for the Respondent (Oct. Term 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

• 1975 WL 173470 (Appellate Brief) Brief Amicus Curiae for Software Associates, Inc. (Oct. Term 1975)

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1974.
July 21, 1975.
On Writ of Certiorari to the United States Court of Customs and Patent Appeals

Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA)

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***1** The Computer & Business Equipment Manufacturers Association (CBEMA) respectfully moves for leave to file the attached Brief Amicus Curiae in the above-entitled case. Petitioner has consented to the filing of this brief. The consent of respondent was requested but refused.

This Court granted CBEMA's motion for leave to file a brief as Amicus Curiae in support of the Petition for the granted Writ of Certiorari in this case.

***2** CBEMA is the trade association which, along with its predecessor association, the Business Equipment Manufacturers Association, has represented the computer and business equipment industry for the past 59 years. The companies comprising the current CBEMA membership include the nation's leading manufacturers of computers, business equipment and related products. While product lines of member companies vary widely, the following list is illustrative: electronic computers, computer software including programs, computer input and output devices, computer storage devices, support services, data transmission equipment, optical character readers, addressing machines, accounting machines, bookkeeping machines, mail handling equipment, duplicating machines and office copying machines. CBEMA is also the approved sponsor under the American National Standards Institute (formerly the American Standards Association) for the establishment of domestic and international standards related to information processing, computers and office machines.

Members of CBEMA have consistently been leaders in achieving major developments, in both the concept and application, of computer programming and data processing, and have contributed greatly to the present significant status and role of the computer in modern society. These members maintain and support extensive activities devoted to applied research and systems development in all phases of computer use and data processing.

Not only is the subject matter of the present suit of vital concern to manufacturers in the computer and data processing field, it is also of vital concern to the Government and to the public generally. The resolution of the issues squarely presented in this case will affect the development of the data processing industry in the United States and will have an impact on those segments ***3** of our society which use and receive the benefits of technological advances in this industry.

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CBEMA believes that, because of its extensive back-ground in computer hardware and software, it is in a position to present a unique point of view not likely to be covered by the Solicitor General.

Accordingly, CBEMA respectfully requests that this Court grant leave to file the attached Brief Amicus Curiae.

***1** I QUESTIONS PRESENTED

1. Whether subject matter which is not patentable under 35 U.S.C. § 101 becomes patentable if a general purpose computer is programmed to perform the non-patentable subject matter.

***2** 2. Whether an existing general purpose computer programmed to perform a financial accounting procedure comprises patentable subject matter under 35 U.S.C. § 101 when claimed as a "machine system".

II

INTEREST OF THE COMPUTER & BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

This brief Amicus Curiae is submitted by the Computer & Business Equipment Manufacturers Association (CBEMA) in accordance with Rule 42(2) of this Court. Petitioner has consented to the filing of this brief. The consent of respondent was requested but refused.

This Court granted CBEMA's motion for leave to file a brief as Amicus Curiae in support of the Petition for the granted Writ of Certiorari.

CBEMA is the trade association which, along with its predecessor association, the Business Equipment Manufacturers Association, has represented the computer and business equipment industry for the past 59 years. The companies comprising the current CBEMA membership include the nation's leading manufacturers of computers, business equipment and computer-related products. While product lines of member companies vary widely, the following list is illustrative: electronic computers, computer software including programs, computer input and output devices, computer storage devices, support services, data transmission equipment, optical character readers, addressing machines, accounting machines, bookkeeping machines, mail handling equipment, duplicating machines and office copying machines. CBEMA is also the approved sponsor under the American National Standards Institute (formerly the American Standards Association) for the establishment of domestic and international standards relating to information processing, computers and office machines.

***3** Members of CBEMA have consistently been leaders in achieving major developments, in both the concept and application, of computer programming and data processing, and have contributed greatly to the present significant status and role of the computer in modern society. These members maintain and support extensive activities devoted to applied research and systems development in all phases of computer use and data processing.

CBEMA does not have any direct or indirect interest in the Johnston patent application. As Amicus Curiae herein, CBEMA has a deep interest in the proper resolution of the legal questions raised in this case and the profound impact of

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this decision will have upon the data processing industry and the public it serves.

Not only is the subject matter of the present case of vital concern to manufacturers in the computer and data processing field, it is also of vital concern to users of computer equipment, including the Government, and the public generally. The resolution of the issues presented in this case will affect the development of the data processing industry in the United States and will have an impact on those segments of our society which use and receive the benefits of technological advances in the industry.

This brief outlines the difficulties and uncertainties in the development and use of computer programs which will follow if the Lower Court's decision is affirmed, as well as the social, economic and practical implications of any holding that computer programs of the type sought to be patented in this case are patentable subject matter. It is CBEMA's position that the majority of the Lower Court misconstrued this Court's holding in Gottschalk v. Benson [FN1] concerning patentable subject matter.

FN1. 409 U.S. 63 (1972).

***4** III

THE NATURE OF THE COMPUTER AND COMPUTER PROGRAMS

The computer enhances and extends man's problem solving capacity by providing more powerful methods for calculating, storing, organizing, structuring, retrieving and manipulating large amounts of information in the form of data. Fundamentally, the computer expands the ability of man to use his intellectual capacity.

A general purpose digital computer may be described in the following manner. The machine has input and output units which accept and deliver data; a memory which holds or keeps data in addressable locations; a computer unit which performs various arithmetic and logical operations upon the data; and a control unit which controls the operations and coordinates the activities of the other units. A program of instructions for operating the computer is stored in the memory and during operation of the computer directs the control unit to cause the various other units to perform their operation in a designated sequence to obtain a useful result. The data or instructions are manifested in these various units by electrical pulses or states. Each of these units contains devices for manipulating or handling the electronic pulses. [FN2]

FN2. For a general discussion of how a computer operates, see "Protecting Proprietary Rights of Computer Programs: The Need for New Legislative Protection," 21 The Catholic Univ. L. Rev. 181 (Fall 1971).

Although a computer is capable of handling a large variety of problems, the number of basic operations it can perform (adding, subtracting, multiplying, dividing, comparing, shifting, storing and the like) is limited. ***5** Every computer can operate solely in accordance with the directions it is given. These directions are contained in computer programs and instruct the computer how it should manipulate and compare data in accordance with an algorithm, which is simply a step-by-step procedure for accomplishing a desired result. For example, the algorithm may be a mathematical formula, a method of doing business, or an expression of a scientific principle or

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law of nature.

A computer program is a set of instructions to a computer as to how it should manipulate data. [FN3] The computer program may direct something as simple as adding two plus two, or as complex as determining the proper course for a manned flight to the moon. In solving such problems, the computer can only function in accordance with the algorithm used by the programmer for solving the problem.

> FN3. A computer program is often described as either a "systems" or "applications" program. A systems program is normally developed by the computer manufacturer. It is designed as an integral part of the computer and functions in a housekeeping capacity for the many specific types of jobs to be performed. On the other hand, an applications program merely utilizes an existing computer as a tool to solve a particular problem. An applications program does not give rise to new system functionality or result in changes in the computer provided by the manufacturer. A large number of applications programs are developed by the various computer users. Respondent's program is a prime example of an applications program because it is addressed to solving a problem external to the computer system where the computer is simply being used as a tool to perform the financial banking algorithm sought to be patented.

A computer program is created in the following manner: A programmer first develops an algorithm which sets forth in broad terms the desired mathematical principles or logical sequences to be used in solving the problem. [FN4] The next step in the process is the development ***6** of a detailed set of instructions which the computer follows in carrying out the algorithm. This set of instructions is a computer program. In devising the algorithm and in preparing the program it is not necessary to be knowledgeable about the computer's internal workings or how it actually handles and manipulates the data received. Given a particular algorithm, the programmer takes the limited number of fixed operations which a computer is capable of carrying out and arranges these operations in a sequence so that the desired algorithm is implemented. Once the algorithm has been established, any programmer can program a general purpose computer to perform the steps of the algorithm. [FN5]

> FN4. An algorithm is often expressed in a written flow chart, which is not hardware. See Figures 1A through 9C of the Johnston patent application. (Pages 277-291 of the record below).

> FN5. See discussion of basic elements of computer programming in Breyer. "The Uneasy Case for Copyright: A Study of Copyright in Books. Photocopies, and Computer Programs," 84 Harv. L. Rev. 281, 340-51 (1970).

An appropriate analogy is often considered to be found in the way in which a player piano operates. The piano has a mechanism for automatically operating its keys according to the instructions contained in a punched paper piano roll. A given musical composition can be automatically played on the piano by simply punching holes in the piano roll so that the keys will play the musical notes called for by the composition. The piano and its control mechanism are designed in such a way that it is able to perform any musical composition whose notes are recorded in the piano roll.

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The algorithm upon which a computer program is based is the equivalent of the musical composition in the player piano analogy, and the series of machine instructions used to implement the algorithm in a computer program are analogous to the instructions punched into the paper piano roll. In both instances, the second step amounts to nothing more than a set of instructions for the machine (***7** i.e., computer or piano) automatically to implement the steps contained in the algorithm or musical composition. Such creativity as exists lies solely in the development of the algorithm or musical composition, and any patent issuing thereon would necessarily be grounded on the algorithm or musical composition.

Respondent advocates that a computer is a warehouse of unrelated parts and that a program applied to such a computer creates instant hardware from these unrelated parts which may be claimed as a machine system. A computer is not a warehouse of unrelated parts, any more than is a player piano. This warehouse-of-unrelated-parts concept finds no basis in fact and is strictly a vehicle to support the patenting of non-patentable subject matter. [FN6]

FN6. The United States Patent & Trademark Office has granted patents on computers and player pianos as machine combinations which would not have been granted if, in fact, they were only a "warehouse of unrelated parts."

IV
ARGUMENT

A. The Holding By The Lower Court Conflicts With This Court's Holding In Gottschalk v. Benson

In Gottschalk v. Benson, [FN7] this Court held that a mathematical process for converting binary-coded-decimal numerals into pure binary numerals, which had been embodied in a computer program for use in a general purpose digital computer, was not a patentable process within the meaning of 35 U.S.C. § 100(b). By so holding, this Court explicitly recognized that granting patent protection to the computer programming process would, in effect, provide such protection to the algorithm itself. Thus, the Court looked to the substance of the claimed ***8** invention--a mathematical algorithm--and determined that the contribution was non-patentable subject matter under the patent laws.

FN7. 409 U.S. 63 (1972).

In the decision below in this case, the Court of Customs and Patent Appeals held that a general purpose computer programmed with a financial banking procedure and claimed as a new "machine system" is patentable subject matter under 35 U.S.C. § 101. [FN8] That holding focuses on the form of the claims presented to the Court, however, and does not look, as did this Court's holding in Gottschalk v. Benson, to the substance of the alleged contribution. Respondent has not devised a new "machine system" in the sense of combining hardware elements. A review of the record shows that no machine has been invented in this case or disclosed in respondent's patent application [FN9] and that respondent's real contribution is a financial banking algorithm implemented on a general purpose computer. This is conceded by respondent, who admitted in his brief before the Court of Customs and Patent Appeals that "the invention is being sold as a program to banks" and was "reduced to practice in the

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software form of computer programs....." [FN10]

FN8. The Lower Court's Opinion is reported at 502 F.2d 765 (C.C.P.A. 1974).

FN9. For example, the so-called "control system" disclosed in respondent's patent application is not hardware but simply applications program routines for manipulating bank account data.

FN10. See page 18 of respondent's brief before the C.C.P.A. and Judge Rich's dissent, 502 F.2d at 773.

Financial banking procedures are methods of doing business which, like mathematics, plans of action, scientific principles, ideas, laws of nature, etc., historically have been considered non-patentable as a matter of public policy. Thus, even if respondent had disclosed a hardware implementation for his non-patentable algorithm, ***9** it should not be patentable if claimed so broadly as to provide patent protection for the algorithm. Unless this Court holds respondent's application program unpatentable, it would be possible simply to disclose an obvious hardware implementation for the algorithm, such as a general purpose computer, as a basis for effectively obtaining patent protection for the algorithm.

This Court should not sanction any procedure for patenting non-patentable subject matter. Thus, where a computer program is predicated upon a non-patentable algorithm, the program should not be patentable as a "machine system" even if it coacts "synergistically" with the computer. [FN11] In the instant case, however, the Court need not address the concept of synergism since none exists. The computer is simply being used as a tool to perform the financial banking algorithm developed by respondent.

FN11. This is a requirement for patentable combinations established by this Court. See Andersons-Black Rock v. Pavement Salvage Co., 396 U.S. 57 (1969).

The holding below has created an improper extension of the patent system by providing patent protection (1) for a non-patentable algorithm, (2) implemented as a computer program, (3) for use in a general purpose computer, and (4) claimed as a "machine system". Thus, the Lower Court has explicitly approved a procedure to patent indirectly subject matter which could not be patented directly. [FN12]

FN12. See this Court's recognition of the admonition by the President's Commission on the patent system regarding patenting indirectly subject matter which could not be patented directly. 409 U.S. at 72.

If semantic distinctions are set aside for purposes of determining whether the claimed inventions are drawn to patentable subject matter, the "machine system" in the instant case is in the same category as the mathematical "process" in Gottschalk v. Benson. In both cases, ***10** they are simply computer programs for performing algorithms, which are not patentable subject matter. This was recognized in the dissent below, where it was observed that every competent patent draftsman can write process claims in machine system form. [FN13]

FN13. 502 F.2d at 773.

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The determination whether the disclosed invention constitutes patentable subject matter must be made by examining the substance of the discovery, rather than the form in which it is claimed. The patentability of respondent's claims must be judged in the light of his actual contribution--a financial banking algorithm embodied in a program for a general purpose computer. When the substance of the invention is considered, the result of the Lower Court's decision conflicts with this Court's holding in Gottschalk v. Benson. [FN14]

FN14. This Court found claims in product form improper because they, in effect, covered non-patentable subject matter in Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127 (1948). See also O'Reilly v. Morse, 56 U.S. (15 How.) 62 (1853); Armour Pharmaceutical Co. v. Richardson- Merrell, Inc., 396 F.2d 70 (3d Cir. 1968); Davison Chemical Corp. v. Joliet Chemicals, Inc., 179 F.2d 793 (7th Cir. 1950); Templeton Patents, Ltd. v. J. R. Simplot Co., 336 F.2d 261 (9th Cir. 1964). Substantively, respondent relies on non-patentable algorithmic functions in the claims to support patentability of components found in every general purpose computer. The effect is to claim the algorithm.

B. Policy Considerations Opposed To The Availability Of Patents For Computer Programs Of The Type Contained In This Case

1. The Computer Industry Has Developed In An Atmosphere Of Free Interchange Of Computer Programs

In two decades the computer industry has become a major and substantial factor in our economy and now impacts virtually all segments of society. When computers were first used commercially less than twenty-five ***11** years ago, a number of respected businessmen, scientists and public officials believed that the ultimate need for such highly sophisticated devices would be limited to a few dozen systems. In fact, the uses and applications of computers have increased beyond the most extravagant earlier projections, and by 1974, over 255,000 computer systems made by American-based companies were reported to be in use, with a cumulative value of $54.1 billion. [FN15] This rapid growth will continue over the next few years and it has been estimated reliably that by 1979, there will be over 886,000 American-made computer systems in use with a value in excess of $99.7 billion. [FN16]

FN15. EDP Industry Report, April 30, 1975, Vol. 10, Nos. 15 and 16 at p. 9. These figures are for worldwide use of computers made by American companies. In the United States alone, the cumulative value of computer systems in use in 1974 is estimated at $33.6 billion and by 1979 this figure is projected at $60.2 billion.

FN16. Id. at p. 9. This report also states on page 1 that in 1974, total worldwide shipments for American-based companies of computers was $11.2 billion and that by 1979 total revenue will be $18.9 billion.

In the so-called programming and software side of the industry, computer users are already spending as much on software as they are on computer hardware, and the software field has itself become a multi-billion dollar sub-industry. [FN17] The growth rate of the software field is expected to increase significantly and in less

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than five years ***12** computer users will be spending at least twice as much on software as on computer hardware. [FN18] For example, it has also been estimated reliably that the gross value of software purchased and supplied in the United States in 1970 was approximately $5 billion, that in 1975 this figure should double to $10 billion, and that by 1980, it will triple to $15 billion. [FN19]

FN17. To select an arbitrary point in time to illustrate the growth factor, in 1957 the Association for Computing Machinery had approximately 3,000 members which represented the vast majority of the working computer programmers in the United States. Some fifteen years later in 1972, it was estimated that the number of employed programmers exceeded 250,000 and by 1985 it has been estimated that there will be in excess of 640,000 working programmers. See Expanding Use of Computers In The 70's, Markets-Needs-Technology, 51 (Prentice Hall 1971); "Carlson Testifies on Programmer-Professional or Not," 14 Communications of the ACM 201 (March 1971), S.S.D. No. 249 S.I.L.T. Presentation at Share Meeting XLIII, p. 25 (October 15, 1974); U.S. Gov. Occupational Outlook Handbook, 1972-73 edition and 1973-1974 edition.

FN18. "Towards the Computer Utility: Evolution or Revolution," Datamation 125 (October 1969).

FN19. See Expanding Use of Computers in the 70's, Markets-Needs-Technology, 54-55 (Prentice Hall 1971).

The tremendous growth of the computer software industry and the vast number of breakthroughs in the field of programming, which have occurred in the last two decades, have by and large taken place in a legal framework conducive to the free interchange of ideas and information. Industry experience shows that new algorithms and programming procedures, as well as specific programs, have been widely disseminated and generally exchanged. This atmosphere of intellectual freedom has contributed significantly to the enormous strides made in the use of computers.

Wide dissemination of computer programs has benefited the users of computers and the public at large. For years professional journals have published algorithms and pertinent discoveries in mathematics in order to encourage overall advancement of the "state of the art" of programming. At various seminars and symposia on computer programming, open, frank and public discussions have been held concerning newly formulated algorithms or refinements of existing algorithms, and the participants have sought to build upon and improve the overall level of knowledge in the programming field. However, if patent protection for computer programs is permitted merely by the semantic innovations allowed by the Lower Court in this case, more restrictive and inhibiting ***13** information handling practices will be inevitable. In fact, certain professional journals have already taken the position that they will no longer publish allegedly novel algorithms if the person who develops them claims patent protection. [FN20]

FN20. The Association of Computer Machinery ("ACM") has taken this position with respect to its monthly publication known as the Communications of the ACM. The membership of this association includes many professional computer programmers who rely upon and look to such professional journals for maintaining and improving their general knowledge concerning developments in

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the programming field.

Another significant consideration is that the programming industry is quite different from other industries in which patent laws have wide application. One of its unique characteristics is that almost all of the end users of programs are also creators and duplicators of programs. [FN21] Although there are thousands of computer systems in this country, these systems service millions of users. Many of these user orga??zations have large staffs of programmers who spend full time preparing new algorithms or sets of instructions for programs, and these same users characteristically spend more for computer programming services than they pay for use of the computer.

FN21. It is the user of a computer who often devises the applications programs, i.e., the programs which adapt the computer and a general systems program to his specific uses.

In permitting the originator of an algorithm to obtain patent protection simply by drafting "machine system" claims, the Lower Court has imposed substantial practical impediments upon all users of computers. Users will be forced to assume a major responsibility for determining potential infringement claims arising out of computer applications programs they intend to use. They will be burdened with the need to spend substantial time ***14** and money in right-to-use searches each time a different algorithm is to be programmed on an existing computer. Some may even employ secret methods of handling computer programming information in order to prevent others from ascertaining that they may have infringed an existing patent. Adversely held patents based upon computer programs will be a constant threat to the unrestricted use of computers.

These problems are magnified in the instant case where the algorithm utilized in respondent's financial banking procedure may also be used for manipulating data in other, unrelated, areas of business and technology. This result stems from the fact that a computer is a tool which may be thought to operate on abstract ideas. For example, when performing the computations for Einstein's formula $E??MC^2$, which demonstrates the relationship between matter and energy, the computer is performing the same steps as in calculating $A??r^2$, the area of a circle. If patentability depends upon the generalization of computer operations common to both equations, the effect is to patent an abstract principle unlimited to specific applications. In the instant case, respondent's claims could be construed as not specifically limited to financial banking. Thus, if respondent's claims are held to be patentable by this Court, prospective users of respondent's algorithm in other unrelated areas of endeavor could be subject to a charge of infringement.

A patent may be infringed without knowledge of the patent or intent to infringe. If computer programs were patentable either directly or indirectly as a "machine system," each user of a computer would proceed at his peril in employing the computer for his particular application. He would never know whether the algorithms in his program were specifically covered by an existing patent or were the equivalent of a claim in a patented program. Such users could be confronted with the real possibility ***15** that use of a particular algorithm would involve them in infringement litigation unless they were to pay royalties claimed by holders of patents covering allegedly comparable programs.

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It is not a practical answer to say that each user could make a search to determine whether his proposed program infringed an existing patent. There is not now--and there does not appear to be in the future--any feasible way in which such searches could be made. Nor can the burden be assumed by, or shifted to, suppliers of computers who do not have responsibility for, or often even knowledge of, the precise programs employed by users of their computers. [FN22]

FN22. This Court recently was confronted with an analogous problem in connection with copyright infringement. In Twentieth Century Music Corp. v. Aiken, 43 U.S.L.W. 4799 (June 17, 1975), the Court held that copyright laws did not prevent the proprietor of a restaurant from freely playing his radio for the enjoyment of patrons. In reaching this conclusion the Court observed: First, a person in Aiken's position would have no sure way of protecting himself from copyright infringement except by keeping his radio set turned off. Id. at 4802.

2. Programmed General Purpose Computers Are Important To All Phases Of Human Endeavor

Increased computer utilization stimulated, in part, by the free and open exchange of computer programs, has contributed to a substantial upgrading of the quality of life for every American. The computer has become the "engine" which assists in running our society [FN23] and will be able to assist man in numerous areas totally unrelated to the usual business applications for computers today. [FN24] ***16** Some typical examples of computer uses and applications which have occurred and can occur in the next few years include the following:

FN23. Binger, The Computer: Engine of the Eighties, Advanced Management Journal (January 1967).

FN24. Among the many articles discussing the revolutionary impact computers will have on our society are the following: F. G. Withington, "Beyond 1984: A Technology Forecast," Datamation, Vol. 21, No. 1, Jan. 1975); Bjerrum, "Forecast of Computer Developments and Applications 1968- 2000," Futures, June 1969; Martino. "What Computers May Do Tomorrow," The Futurist, October 1969; Hammer, "Electronic Systems of Today and Tomorrow," Paper for State Department Seminar, June 1969; "What Comes Next in the Computer Age." U.S. News & World Report, June 1967; Diebold, "The New World Coming." Saturday Review, July 23, 1966; Ware, "Future Computer Technology and its Impact," The Rand Corporation, March 1966.

Health Care

Computers are monitoring instruments and sensors in intensive care units and give an instantaneous current report of the condition of each patient in a hospital. Computers also record and analyze laboratory tests and maintain accurate medical records on all patients. They are serving communication and information links among various hospitals and individual doctors' offices and clinics, and are beginning to provide current information on many developments in the medical field. Computers are presently being utilized in assisting medical research in searching for cancer

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cures. [FN25]

FN25. McCarn and Moriarty, "Computers in Medicine." Hospitals J.A.H.A., January 1, 1971; "The Computer in Medicine," Am. News, March 2, 1970; Reilly, "Computers in Medicine," Datamation, May 1969.

Education

Computer-aided training and instruction techniques are moving from research to implementation making high quality education available to more children on an equal basis. Computers will be heavily responsible for enabling everyone, regardless of economic status, to have the advantages of higher learning. In addition, computers are being used increasingly in the world's great research ***17** libraries to cope with the exploding growth of recorded knowledge. [FN26]

FN26. See Computers in Higher Education, Report of the President's Science Advisory Committee, February 1967; Hansen, "Computers in Education," The Clearing House, December 1970, Vol. 45, No. 4, p. 195.

Science and Engineering

Computers will continue to contribute possible further advances in science and engineering. They have already made possible this country's exploration of other planets and the Apollo Program to put a man on the moon. Scientists perform complex mathematical computations with computers and through them, have available large libraries of data for rigorous analysis. Further, utilization of computers will make possible a pushback in the frontiers of mathematics, chemistry, physics and engineering to an extent difficult to comprehend by present standards. Just one example is the search for new energy sources, which will be aided greatly by computers.

Government

Computers present unique opportunities for Government to be more effective and helpful to the average citizen. With the aid of computer programming techniques, a given problem such as pollution control or urban planning, can be simulated in terms of a mathematical model. This model can then be entered into the computer and the data manipulated to simulate actual results from the application of a proposed solution.

Legal

There are also tremendous potentials for computers to assist in relieving the nation's crowded court dockets, to collect and analyze legal documents and precedents, and to achieve better overall administration of the rapidly ***18** increasing workload of the police and law enforcement agencies.

In the case of judges and lawyers, computers are being used increasingly to assist in legal research freeing additional time for analysis. Computers also furnish invaluable assistance in collecting, summarizing and cataloging much of the factual data involved in complex litigation and other areas of the law.

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Individual

It is reasonable to expect that computers will continue to present unique opportunities for the average individual in his everyday activities. In the home, computers will assist in performing such functions as food procurement, climate and lighting control as well as other home management functions. Also, computers will make it possible for individuals to obtain information needed on many subjects through point-to-point communication with a central computer or small individually-owned computers. Inexpensive electronic hand-held calculators, some of which are programmable, are already in widespread use. In a few years, computer terminals or communication devices will be just as common in homes as telephones or television sets.

3. Because Many Countries Do Not Grant Patents On Computer Programs There May Be An Adverse Financial Impact Upon The United States Unless The Lower Court's Decision Is Reversed

At present, many countries in Western Europe prohibit the granting of patents on computer programs. For example, in France, a statute was enacted which specifically prohibits patent protection for computer programs. [FN27] ***19** Similarly, in Germany, [FN28] the Netherlands, [FN29] and Switzerland, [FN30] there have been court decisions declaring computer programs to be ineligible for patents. The United Kingdom's Government has appointed a committee to examine the patent system. That committee recommended that patent protection not be available for computer programs, [FN31] and this recommendation has recently been reaffirmed by the British Government. [FN32]

FN27. Article 7 of the French Patent Law of January 2, 1968. An English translation appears in Industrial Property 67-75 (BIRPI, Geneva, Switz., March 1968).

FN28. The Federal Patent Court of Germany handed down two decisions on July 23, 1974 and one decision on August 6, 1974, against computer program patenting.

FN29. A decision of the Patent Office Board of Appeals on December 16, 1970, held that computer programs are not patentable under the Netherlands Patent Act, BIE No. 2, February 15, 1971.

FN30. Computer programming inventions are currently considered unpatentable in Switzerland as the result of a Swiss Patent Office decision of September 3, 1968. Patent Master Und Markenblatt 68-1-53.

FN31. The British Patent System. Report of the Committee to Examine the Patent System and Patent Law, Cmnd. No. 4407, at 144 (July 1970).

FN32. Presented to Parliament by the Secretary of State for Trade by Command of Her Majesty (April 1975). Item 12 on page 4 includes the following statement: ".... There will also be a non-exhaustive list of exclusions from patentability .... (which) will include, amongst other things, computer

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programs ....".

Since several countries in Western Europe have decided not to extend patent protection to computer software, a serious international legal and balance of trade problem can result if the Lower Court's decision in this case is affirmed. In such case, someone in a foreign country could easily use or copy a program on which a patent has been issued in this country and have total immunity from any infringement claims under our law. Because of the availability of instantaneous communication between Western Europe and the United States, it would then be possible to use the patented program in Europe and communicate the result directly to a computer ***20** located in the United States. Under these circumstances, the domestic patent would be rendered virtually ineffective, and the chief result would be a negative impact on our domestic economy. Among other things, such result would constitute an unfortunate and avoidable violation of United States employment and trade policy.

C. Whether Claimed As A Process Or Machine System, The Nature Of Computer Programs As A Method Of Doing Business Render Them Ineligible For Patent Protection Under The Constitution And The Patent Code

As noted in Section A, the Lower Court in this case held that a computer program may be patented under the applicable sections of the Patent Code, Title 35, U.S.C., [FN33] if claimed as a "machine system". Not only does this holding conflict with this Court's decision in Gottschalk v. Benson, supra, but also the considered view of the United States Patent Office and the President's Commission on the Patent System. [FN34]

FN33. The relevant statutory provisions are contained in Sections 101 and 102 of the Patent Code, Title 35, U.S.C.

FN34. See "To Promote the Progress of Useful Arts." The 1966 Report of the President's Commission on the Patent System (reprinted in S. Doc. No. 5, 90th Cong., 1st Sess. p. 21).

As previously explained, a computer program is a set of operating instructions for a computer and implements an algorithm which, for example, may be mathematical or a method of doing business. The significance of the instant case is that it makes possible the patenting of a "machine system" claim covering an algorithm for a method of doing business, regardless of the type of general purpose computer used for implementation. The result of the Lower Court's view makes only the form of the claim important, not the substance of what is being claimed. The effect of that decision is to provide ***21** patent protection to abstract ideas, scientific principles, and the like, as well as methods of doing business. Such result is inconsistent with this Court's holding in Gottschalk v. Benson. [FN35]

FN35. See 409 U.S. at 71 where the Court said: "It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula ... were patented in this case."

The relevant clause in the Constitution which governs the granting of patents is contained in Article I, Section 8, Clause 8 which provides:

The Congress shall have power ... to promote the progress of science and useful

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arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

The focus of the patent clause (and the statutes implementing that clause) is on "progress," and Congress is granted only a "qualified authority ... limited to the promotion of advances in [science and] the useful arts." Graham v. John Deere Co., 383 U.S. 1, 5 (1966). Because [t]he patent system must promote ... progress," Graham, supra, "[p]atents cannot be sustained when ... their effect is to substract from former resources freely available to skilled artisans," Great A & P Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 152 (1950). [FN36]

> FN36. As this Court declared in Precision Instrument Mfg. Co. v. Automotive Maintenance Mach. Co., 324 U.S. 806, 816 (1945):
> A patent by its very nature is affected with a public interest. As recognized by the Constitution, it is a special privilege designed to serve the public purpose of promoting the 'Progress of Science and Useful Arts.' At the same time, a patent is an exception to the general rule against monopolies and to the right to access to a free and open market. The far reaching social and economic consequences of a patent, therefore, give the public a paramount interest in seeing that patent monopolies ... are kept within their legitimate scope.

***22** Among such resources are the scientific principles, mental processes, methods of doing business and abstract intellectual concepts which are the basic instruments of business, science and technological development. The free interchange of such information cannot be restricted by patents. As Chief Judge Garret observed in In re Abrams, 188 F.2d 165, 168 (C.C.P.A. 1951):

Citation of authority in support of the principle that claims to mental concepts which constitute the very substance of an alleged invention are not patentable is unnecessary. It is self-evident that thought is not patentable. [FN37]

> FN37. Also see the passages from the letters of Thomas Jefferson, the first administrator of our patent system, quoted in Graham v. John Deere Co., 383 U.S. at p. 8, n.2.

The algorithms which are sought to be patented in this case are based on rules of logic which are more like thought and mathematical principles than anything else. They should be treated in the same manner as the algorithms in Gottschalk v. Benson.

The U.S. Patent and Trademark Office recognizes that the form of claim does not change the character of the non-patentable subject matter sought to be patented. Thus, its guidelines issued in 1968 state that "computer programming per se, whether defined in the form of a process or apparatus shall not be patentable." [FN38] In keeping with this view, the Patent and Trademark Office ***23** Board of Appeals in this case refused to allow the machine claims on the ground that non-patentable subject matter was being claimed, regardless of the form of the claim.

> FN38. Patent Office Guidelines to Examination of Application for Patents on Computer Programs, 22 Fed. Reg. 15609 (1968); emphasis added. These guidelines were suspended only after the Lower Court issued a series of decisions, which in effect held that computer programs were patentable as a "process" under the

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patent laws. See, In re Prater, 415 F.2d 1378 (C.C.P.A. 1968), mod on reh 415 F.2d 1393 (C.C.P.A. 1969); In re Bernhart, 417 F.2d 1395 (C.C.P.A. 1969); In re Musgrave, 431 F.2d 883 (C.C.P.A. 1970); In re Mahoney, 421 F.2d 742 (C.C.P.A. 1970); In re Foster, 438 F.2d 1011 (C.C.P.A. 1971); In re McIlroy, 442 F.2d 1397 (C.C.P.A. 1971).

The claims involved in this case essentially deal with a method of doing business-- a procedure for manipulating data to give an informational result-- and the mere fact that a computer is used as a tool for implementing the algorithm involved in the financial banking system sought to be patented does not convert a method of doing business, or the logical principles upon which it is based, into a "patentable machine." The Lower Court's decision has misconstrued the applicable statutory provision in extending patent protection to algorithms in this fashion.

D. The Copyright Laws Provide A Viable Form Of Protection For Marketing Computer Programs

This Court in Gottschalk v. Benson observed that if proprietary protection under federal statute is considered necessary for computer programs, it should be accomplished through legislation and not through a distortion of the patent laws. [FN39]

FN39. 409 U.S. at 73. "If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain. The technological problems tendered in the many briefs before us indicate to us that considerable action by Congress is needed."

In this connection the copyrighting of computer programs is becoming established as an acceptable form of protection. In 1964, the Copyright Office determined that computer programs can be registered under the copyright laws if certain requirements are met. [FN40] Since the announcement, ***24** over a thousand such programs have been registered with the Copyright Office. Of course, the existence of copyright protection does not prevent someone from individually arriving at the same result through his own efforts, and a copyright can only protect the form of expression used in a particular program. [FN41] Experience has shown, however, that the copyright law is a viable form of protection in marketing computer programs.

FN40. See U.S. Copyright Office Announcement SML-47 (May 19, 1964). Three conditions which software must meet for copyright protection are: (1) original authorship; (2) publication of copies in a form perceptible or capable of being perceptible to the human eye; (3) depositing copies for registration to consist of or include reproductions in a language intelligible to human beings.

FN41. "The Uneasy Case for Copyright: A Study of Copyright In Books, Photocopies and Computer Programs," 84 Harv. L. Rev. 344, n.247 (1970); "Copyright Protection for Computer Programs," 64 Colum. L. Rev. 1274 (1964); "Scope of Protection for Computer Programs Under The Copyright Act." 14 DePaul L. Rev. 360 (1964); "Computers, The Copyright Law And Its Revision," 20 U.

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Fla. L. Rev. 386 (1968); Cary, "Copyright Registration and Computer Programs." 11 Bull. Copyright Soc'y 361 (1964).

In preliminary work on copyright revision, committees of Congress have explicitly recognized copyright protection for computer programs. [FN42] Congress has also seen fit to enact into copyright legislation provisions for a Commission to study copyright protection in connection with new technology including computer programs. [FN43] This Commission will study reproduction and use of copyrighted works of authorship and recommend procedures for access as well as recognition of the rights of copyright owners.

FN42. Senate Judiciary Committee Report on Copyright Law Revision, 93-983 dated July 3, 1974, page 104.

FN43. Public Law 93-573, December 1974, "To Establish A National Commission On New Technological Uses Of Copyrighted Works And For Other Purposes."

The consensus of non-governmental experts attending a recent meeting of the World Intellectual Property Organization (WIPO), at which computer program protection ***25** discussions were conducted, was that there should be a new type of legal protection for computer programs which would resemble copyright but would be particularly tailored to suit computer software protection. [FN44]

FN44. June 23-27, 1975 World Intellectual Property Organization (WIPO) meeting in Geneva, Switzerland of the Advisory Group of Non-governmental Experts on the Protection of Computer Programs, Report AGCP/NGO/II/10.

V

CONCLUSION

For the foregoing reasons, we respectfully submit that the computer program sought to be patented by respondent Johnston in this case should not be eligible for patent protection and that the Lower Court's decision should be reversed.

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Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173465 (Appellate Brief) Brief for the Respondent (Oct. Term 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

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• 1975 WL 173470 (Appellate Brief) Brief Amicus Curiae for Software Associates, Inc. (Oct. Term 1975)

• 1975 WL 173473 (Appellate Brief) Brief Amicus Curiae for Los Angeles and Philadelphia Patent Law Associations. (Oct. Term 1975)

• 1975 WL 173468 (Appellate Brief) Brief Amicus Curiae for the American Patent Law Association. (Sep. 22, 1975)

• 1975 WL 173467 (Appellate Brief) Brief Amicus Curiae for Universal Software, Inc. (Sep. 03, 1975)

• 1975 WL 173464 (Appellate Brief) Brief for the Petitioner (Jul. 31, 1975)

• 1975 WL 173463 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Mar. 13, 1975)

• 1974 WL 175938 (Appellate Brief) Reply Brief for Petitioner (Oct. Term 1974)

END OF DOCUMENT

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents & Trademarks, Petitioner,
v.
Thomas R. JOHNSTON, Respondent.
No. 74-1033.
October Term, 1974.
March 13, 1975.

On Petition for Writ of Certiorari to the United States Court of Customs and Patent Appeals

Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA)

John S. Voorhees, Kenneth E. Krosin, Richard A. Kleine, 1730 Pennsylvania Avenue, N.W., Washington, D.C. 20006, Counsel for Computer & Business Equipment Manufacturers Association (CBEMA), Amicus Curiae.

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TABLE OF AUTHORITIES

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35 U.S.C. § 101 ... 1, 4, 7

***1** The Computer & Business Equipment Manufacturers Association (CBEMA) respectfully moves for leave to file the attached Brief Amicus Curiae in the above-entitled case. Petitioner has consented to the filing of this brief. The consent of respondent was requested but refused.

CBEMA is the trade association which along with its predecessor association, the Business Equipment Manufacturers Association, has represented the computer and ***2** business equipment industry for the past 59 years. The companies comprising the current CBEMA membership include the nation's leading manufacturers of computers and computer-related equipment. While product lines of member companies vary widely, the following list is illustrative: electronic computers, computer software including rograms, computer input and output devices, compute storage devices, support services, data transmission equipment, optical character readers, addressing machines, accounting machines, bookkeeping machines and office copying machines. The extent to which such equipment can be utilized effectively depends in great measure on the applications and systems programs developed by computer programmers to control the operations of these machines. CBEMA is also the approved sponsor under the American National Standards Institute (formerly the American Standards Association) for the establishment of domestic and international standards related to information processing, computers and office machines.

The members of CBEMA who manufacture computer products have consistently been forerunners in achieving major developments, in both the concept and application, of computer programming and data processing, and have contributed greatly to the present significant status and role of the computer in modern society. These members maintain and support extensive activities devoted to applied research and systems development in all phases of computer use and data and information processing.

Not only is the subject matter of the present suit of vital concern to the CBEMA membership, and to non-CBEMA members in the comptuer and data processing field, it is also of vital concern to the Government and to the public generally. The final outcome of the issues squarely presented in this case will have a significant influence upon both the immediate and the future planning of CBEMA members with respect to ways and means of ***3** protecting the proprietary fruits resulting from computer program research and development. Thus, the outcome of the present case will inevitably affect the future growth and development of the data processing industry in the United States and will have a corresponding or greater impact on the vast segments of our society which use and receive the benefits of technological advances in this industry.

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The attached Brief Amicus Curiae presents together two important and closely related aspects of this case which were not fully treated in the Solicitor General's petition:

(1) The critical confusion caused by the decision of the Court below in the wake of this Court's decision in Gottschalk v. Benson, 409 U.S. 63 (1972); and

(2) The resulting economic impact of major proportions upon the public, the computer industry, and computer users, including the Government.

Accordingly, CBEMA respectfully requests that this Court grant leave to file the attached Brief Amicus Curiae.

***1** I QUESTION PRESENTED

Whether an existing general purpose computer programmed to perform a financial accounting function comprises subject matter which may be patented under 35 U.S.C. § 101 when claimed as a "machine system" for financial accounts.

***2** II

INTEREST OF THE COMPUTER & BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

This Brief Amicus Curiae is submitted by the Computer & Business Equipment Manufacturers Association (CBEMA) in accordance with Rule 42(1) of this Court. Petitioner has consented to the filing of this brief. The consent of respondent was requested but refused.

CBEMA is the trade association which along with its predecessor association, the Business Equipment Manufacturers Association, has represented the computer and business equipment industry for the past 59 years. The companies comprising the current CBEMA membership include the nation's leading manufacturers of computers and computer-related equipment. While product lines of member companies vary widely, the following list is illustrative: electronic computers, computer software including programs, computer input and output devices, computer storage devices, support services, data transmission equipment, optical character readers, addressing machines, accounting machines, bookkeeping machines and office copying machines. The extent to which such equipment can be utilized effectively depends in great measure on the applications and systems programs developed by computer programmers to control the operations of these machines. CBEMA is also the approved sponsor under the American National Standards Institute (formerly the American Standards Association) for the establishment of domestic and international standards related to information processing, computers and office machines.

The members of CBEMA who manufacture computer products have consistently been forerunners in achieving major developments, in both the concept and application, ***3** of computer programming and data processing, and have contributed greatly to the present significant status and role of the computer in modern society. These members maintain and support extensive activities devoted to applied research and systems development in all phases of computer use and data and information processing.

Not only is the subject matter of the present case of vital concern to CBEMA members and non-CBEMA members in the computer and data processing field, it is also of vital concern to users of computer equipment, including the Government, and the

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public generally. The final resolution of the issues presented in this case will have a significant influence upon both the immediate and the future planning of CBEMA members with respect to ways and means of protecting the proprietary fruits resulting from computer program research and development. Thus, the outcome of the present case will inevitably affect the future growth and development of the data processing industry in the United States and will have a corresponding or greater impact on the vast segments of our society which use and receive the benefits of technological advances in the industry.

III

REASONS FOR GRANTING THE WRIT

A. The decision of the Court below has created substantial confusion in the wake of this Court's decision in Gottschalk v. Benson.

In Gottschalk v. Benson, 409 U.S. 63 (1972), this Court held that a mathematical process embodied in a computer program for use in a general purpose digital computer was not a patentable process within the meaning of 35 U.S.C. § 100(b). In the decision below the Court of Customs and Patent Appeals held that a programmed ***4** general purpose computer claimed as a new "machine system" constitutes patentable subject matter under 35 U.S.C. § 101. However, it is not clear whether the decision below is limited to an interpretation that such a "machine system" is patentable technological art, or an interpretation which enables a patent draftsman to circumvent this Court's holding in Gottschalk v. Benson. As explained by Judge Rich in his dissenting opinion below, every competent patent draftsman can write process claims in machine system form. Thus, if the lower Court decision stands without clarification, it would appear that patent applicants will be able to obtain patents to machine systems that encompass computer programs simply by drafting claims in the form of such machine systems.

The possibility that this Court's holding in Gottschalk v. Benson can be obviated by routine claim drafting techniques can only lead to substantial confusion. On the one hand, the decision below holds that machine system claims encompassing computer programs satisfy the requirements for patentability. On the other hand, in keeping with Judge Rich's dissent below, it can be argued that this Court's holding in Gottschalk v. Benson would be undermined simply by making semantic changes.

B. A final resolution of this case is necessary because it will have a significant economic impact upon the public, the computer industry, and computer users, including the Government.

The confusion and uncertainty created by the decision below in light of Gottschalk v. Benson will have an economic impact of major proportions that further amplifies the necessity for clarification by this Court. The areas in which the economic impact will be most strongly felt are as follows:

***5** (1) With Respect to Inventors: Should the Solicitor General's petition for a writ of certiorari be denied, inventors of computer programs will have to determine whether or not to invest significant human and tangible resources to prepare and prosecute "machine system" patent applications. Situations will arise where a prior inventor refrains from filing such a patent application because of the uncertainty and confusion caused by the holding of the Court below and subsequent inventors will

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file for and be issued patents presumed valid. Inevitably, time consuming and expensive litigation will follow in order to resolve the conflicting claims.

(2) With Respect to Practice Before the U.S. Patent and Trademark Office: If the Solicitor General's petition for a writ of certiorari is denied, the decision below must be interpreted against this Court's holding in Gottschalk v. Benson by scores of Examiners in the United States Patent and Trademark Office. As a result of the inherent inconsistency between these two opinions, the patentability of "machine systems" will be subject to a wide range of interpretation by the Examiners. Administrative guidelines may limit the extent to which Examiners shall apply these varied interpretations to pending patent applications, but such guidelines will not ensure consistent and uniform interpretations. Inconsistent application of controlling legal principles inevitably will result in protracted patent application prosecution time within the Patent and Trademark Office and costly and time consuming administrative and judicial appeals. This inefficient and wasteful administrative and judicial effort will work to the economic detriment of the public, the Patent and Trademark Office, the courts, and the patent applicants themselves.

(3) With Respect to Patent Litigation: Should the Solicitor General's petition for a writ of certiorari be ***6** denied, all patents with claims to "machine systems" based upon computer programs will issue under a cloud of invalidity. Costly and time consuming litigation to resolve conflicting claims to patentable inventions is inevitable. Moreover, licensing such patents will be nothing more than an expensive guessing game with potentially grave economic impact. Parties may be forced into costly litigation to determine patent validity or forced into costly settlements to avoid the significant expenses of litigation.

(4) With Respect to Government Contracting: If the Solicitor General's petition for a writ of certiorari is denied, there will be uncertainty with respect to the obligations of Government contractors with resulting economic impact. For example, if a "Subject Invention" under a Government contract is a "machine system" for a programmed general purpose computer, the expenses incurred by the contractor and Government will vary greatly, depending upon whether or not the invention is patentable. Clarification of the decision below will enable Government contractors to ascertain the proper procedures to follow and will eliminate unnecessary and wasteful expenditures.

(5) With Respect to the Public Generally: Should the Solicitor General's petition for a writ of certiorari be denied, the questions herein inevitably will be presented to this Court at a future time. If the question reaches this Court through appeal of Federal Circuit Court decisions in patent infringement or licensing actions, a period of several years will have elapsed. Substantial numbers of potentially invalid patents will have been issued in the interim having a correspondingly significant anti-competitive effect upon all areas of commerce and industry touched by computers and computer use.

***7** C. The question presented by the decision below should be reviewed now.

Since the practical result of the decision below will be to bring about an era of uncertainty and confusion in the data processing industry and specifically in the

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development of computer programs, CBEMA submits that the question presented herein should be determined now with finality. Until the issues are resolved by this Court, those who create and use programs may be compelled to operate in an atmosphere of confusion, distrust and secrecy, and will find it necessary frequently to engage in protracted and costly litigation. It can be anticipated that many of the computer program related patents issued by the United States Patent and Trademark Office as a result of the lower Court's holding will be licensed, and that users will have the option of either accepting the license terms or contesting the validity of the patents in infringement litigation. In such litigation, the user's most basic defense will be that "machine systems" for programmed general purpose computers are not patentable subject matter under the Constitution and the Patent Code, 35 U.S.C. § 101. The decision of the Court of Customs and Patent Appeals in this case will not be binding precedent on the various Federal District Courts and Circuit Courts of Appeals which must decide these infringement suits, and in view of the substantial difference of opinion on this question, it is reasonable to expect that conflicting decisions will occur.

To defer review of the issue of patentability of "machine systems" for programmed general purpose computers until patent infringement litigation eventuates and matures to the point of reaching this Court years hence will simply multiply the opportunities for endless litigation.

***8** CONCLUSION

For the foregoing reasons, we respectfully submit that the Solicitor General's petition for a writ of certiorari should be granted.

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Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

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• 1975 WL 173468 (Appellate Brief) Brief Amicus Curiae for the American Patent Law Association. (Sep. 22, 1975)

• 1975 WL 173467 (Appellate Brief) Brief Amicus Curiae for Universal Software, Inc. (Sep. 03, 1975)

• 1975 WL 173464 (Appellate Brief) Brief for the Petitioner (Jul. 31, 1975)

• 1975 WL 173466 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Jul. 21, 1975)

• 1974 WL 175938 (Appellate Brief) Reply Brief for Petitioner (Oct. Term 1974)

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For opinion see 96 S.Ct. 1393

Briefs and Other Related Documents

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Supreme Court of the United States.
C. Marshall DANN, Commissioner of Patents and Trademarks, petitioner,
v.
Thomas R. JOHNSTON.
No. 74-1033.
October Term, 1974.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Reply Brief for Petitioner

Robert H. Bork, Solicitor General, Department of Justice, Washington, D.C. 20530.

Joseph F. Nakamura, Solicitor, United States Patent and Trademark Office, Washington, D.C. 20231.

***1** Respondent does not dispute that the issues in this case are important (Br. in Opp. 11-12) or that there is a conflict in the rationales of the decision below and of the decision in Gottschalk v. Benson, 409 U.S. 63, that warrants resolution by this Court. Rather, respondent contends that this Court "is without jurisdiction" (Br. in Opp. 1) to review one or two [FN1] of the three questions presented. [FN2] That contention, however, rests in part upon a misunderstanding of our position on the merits and is in any event without merit.

FN1. Although respondent apparently includes within his jurisdictional attack the first question presented (i.e., whether Benson may be circumvented by claiming a programmed computer as a "machine system" instead of claiming the programming idea as a "process"), his contentions are directed almost entirely to the second, and broader, question (i.e., whether programs for existing computers are patentable however claimed).

FN2. Respondent concedes that the third question presented (i.e., whether his programming idea was "obvious") is properly before the Court (Br. in Opp. 2).

***2** 1. Respondent's comments concerning the merits of our position reflect a serious misapprehension. We do not contend that "every computer program" necessarily can and must be fit into a "procrustean" mold concerning the extent of inventiveness underlying the basic idea in question and the program to implement it through a computer (Br. in Opp. 8-9). To the contrary, we recognize the possibility of patentability if a program co-acts with an ordinary computer in a "synergistic" way, if the program is carried out with newly-invented apparatus, or if a program produces a new use for an old machine sufficiently inventive to be patentable as a process (Pet. 14-15). Respondent's claimed invention, like a wide variety of computer programming ideas (but perhaps unlike some of the examples cited by

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respondent (Br. in Opp. 8-9)), satisfies none of these requirements.

2. This Court plainly has jurisdiction under 28 U.S.C. 1256 to review the judgment of the Court of Customs and Patent Appeals in this case. "[B]y using broad and unqualified language [in Section 1256], Congress intended [this Court's] certiorari jurisdiction over CCPA cases to be as broad as the Constitution permits." Brenner v. Manson, 383 U.S. 519, 527.

Respondent asserts, nevertheless, that the Commissioner of Patents is "jurisdictionally" barred from challenging in this Court the rationale of the decision of the Court of Customs and Patent Appeals. That is so, respondent claims, because the Commissioner did not (and could not) appeal to that court a statement in the opinion of the Patent Office Board of Appeals (in rejecting respondent's application on grounds other than those on which the patent examiner relied [FN3]) which respondent regards as having rejected the ***3** Commissioner's position in this Court (Br. in Opp. 2), and because respondent's "reasons of appeal" (see 35 U.S.C. 142, 144) to the Court of Customs and Patent Appeals did not comprehend the grounds for rejection asserted by the Commissioner in this Court.

> FN3. The Board regarded as invalid the examiner's apparent premise that even with a different program a general purpose computer "is the same machine" (Pet. App. 28A).

Even if the latter proposition (which we dispute [FN4]) were accepted, it would not affect the propriety of this Court's consideration of any of the questions presented. Where the examiner rejects a patent application on one ground and the Board of Appeals does so on a different ground, if (as here) the judgment of the Court of Customs and Patent Appeals reversing the Board's ruling also constitutes in effect a reversal of the examiner's ruling, then surely the rationale of the examiner's ruling may be considered by this Court on certiorari. Else this Court would be obliged to review judgments of that court in an artificial and unrealistic manner unlike the way it reviews the judgments of other courts. That the Commissioner was limited in the court below by statute (35 U.S.C. 141, 142, 144) in challenging the rationales or the results of decisions of the examiner and the Board in denying respondent's application, does not limit the authority of this Court under 28 ***4** U.S.C. 1256 to review the entire case. Cf. Brenner v. Manson, supra, 383 U.S. at 523, n. 6. [FN5]

> FN4. The 45 assignments of error in respondent's notice of appeal (see App., infra), which challenged virtually every aspect of the Board's decision, may fairly be read as bringing before the Court of Customs and Patent Appeals the questions presented in the petition concerning the patentability vel non of computer programs, whether as processes or machine systems. For example, respondent asserted that the Board had erred in applying the lower court's own decision in Benson (not yet reversed by this Court); in determining that his claims did not involve patentable subject matter; in concluding that his claims did not concern a particular apparatus or enhancement of its functioning; and in holding that there was no difference in substance between his "machine system" and "process" claims, which must stand or fall together (App., infra, pp. 7-9).

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FN5. Had respondent exercised his option to seek review of the denial of his application in the District Court for the District of Columbia (35 U.S.C. 145), rather than in the court below, it is clear that the scope of review in neither the district court nor this Court would be subject to the limitations urged by respondent. It would be "anomalous" and "strange indeed" if the scope of this Court's review were limited "where the alternative route was elected." Brenner v. Manson, supra, 383 U.S. at 527.

In any event, even if in other circumstances the effect of the Patent Code provisions cited by respondent might be to limit this Court's scope of review, they should not be given that effect in this case because of the intervening decision of this Court in Benson, after respondent had delineated his reasons of appeal. In reversing the lower court's judgment in Benson, this Court effectively undermined the basis of respondent's appeal in this case. Under settled principles, the court below would have been bound to apply Benson even if the principles it established had not been implicated by respondent's reasons of appeal. Cf. Bradley v. Richmond School Board, 416 U.S. 696, 711-721; Thorpe v. Housing Authority, 393 U.S. 268, 281. Accordingly, the court below was obliged to apply Benson (and it professed to do so) and the Commissioner is free to challenge in this Court the correctness of its judgment in doing so.

For the reasons stated in the petition and in this reply brief, it is respectfully submitted that the petition for a writ of certiorari should be granted.

***5a** APPENDIX

Patent Appeal No. 9088

NOTICE OF APPEAL TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS, DECEMBER 28, 1971.

Hon. Commissioner of Patents

Washington, D.C. 20231

Sir:

Appellant hereby gives notice of his appeal to the United States Court of Customs and Patent Appeals from the decision of the Board of Appeals rendered on or about October 27, 1971, which decision reversed each of the rejections (which were based on 35 U.S.C. 101, 102 and 112) advanced by the Patent Examiner below and entered new rejections of claims 1 through 11 and 16 through 27, inclusive.

The following are assigned as reasons of appeal:

1. The Board of Appeals erred in failing to allow claims 1 through 11 and 16 through 27 and in entering new rejections of those claims.

2. The Board erred in its summary statement of appellant's invention by omitting important features thereof.

3. The Board erred in holding that the details of the disclosed machine-readable program for a computer "are not brought into issue in this appeal by reason of the

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character of the claims presented."

4. The Board erred in holding that the claims are "either to a method of bookkeeping ... or to apparatus that automatically carries out ... the steps of the bookkeeping method."

***6a** 5. The Board erred in holding that all of the aforementioned claims fail "to point out and distinctly claim that which appellant considers to be his invention" and therefore that the claims fail to meet the requirements of 35 U.S.C. 112, second paragraph.

6. The Board erred in holding that appellant did not consider his invention to be the use of a form of automatic data processing "for the financial record-keeping and statement-furnishing operations of a bank."

7. The Board erred in holding that "the appealed claims, both apparatus and method [are] not directed to improved record keeping machinery, but rather to a broad system of keeping financial records."

8. The Board erred in holding "the distinction over acknowledged prior record-keeping is either in the identity of the person or institution which has custody of certain phases of the bookkeeping operation or in the financial meaning of or the relationship existing between, the various records."

9. The Board erred in holding that there is "broad sweeping reference in the claims to the automation of the banking industry," and that such reference "serves only as a dress for claims that spell out, in effect, the relationship of a bank and its customers, not any particular configuration of business machinery."

10. The Board erred in holding that the claims are indefinite under 35 U.S.C. 112, second paragraph, for "failing to distinctly point out the invention."

11. The Board erred in holding that the claims on appeal, "both method and apparatus, purport to identify record storing portions of the apparatus or method steps, only by the particular financial meaning to be accorded this data."

***7a** 12. The Board erred in holding that the meaning to be accorded data "in no way can define either the construction of the data storing apparatus or the machine processing steps thereof."

13. The Board erred in holding that "there can be no structural or operational relationship of a computer memory with the meaning one chooses to assign outside the computer to a particular configuration of binary digits or 'bits' in its memory."

14. The Board erred in holding that "although a group of such bits is processed as an alphanumeric character within the computer this results from the physical states of the memory cells and manifestly this is unrelated to whether a series of such characters represents a stock number of a part or a sum of money, outside the computer."

15. The Board erred in holding that "the only identification of the meaning

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represented by a section of the computer memory is in the mind of the user and cannot define any characteristic of the apparatus."

16. The Board erred in suggesting that appellant "chooses to denominate a section of its memory by a term descriptive of one meaning, such as a file of stock numbers rather than a file of sums of money."

17. The Board erred in holding that all the claims are indefinite under 35 U.S.C. 112.

18. The Board erred in holding that the claims on appeal embrace, in apparatus claims or as a part of the apparatus steps of method claims, that which has been "held to be outside the scope of apparatus."

19. The Board erred in holding that the claims are "for subject matter outside the patent statutes" and therefore unpatentable under 35 U.S.C. 101.

***8a** 20. The Board erred in holding that "those systems which do extend beyond the field of technology are not within the 'technological arts' and are non-statutory" and in failing to recognize that any constitutional limitation under 35 U.S.C. 101 is to the "useful arts."

21. The Board erred in holding that the Benson et al. decision (169 U.S.P.Q. 548) was a ruling by the C.C.P.A. "that 'liberal arts' are to be exluded from the 'useful arts' and, hence, innovations directed thereto are non-statutory."

22. The Board erred in failing to follow the ruling in Benson et al. that "all other types of business machines" are in the "technological arts."

23. The Board erred in holding that appellant's invention reflects "no concern for the enhancement of the internal functioning of the machine."

24. The Board erred in failing to recognize that the invention of this application falls within the Board's definition of improvements in machines "that replace manual effort" and is therefore within the "technological arts."

25. The Board erred in holding that appellant's invention is outside of the "technological arts."

26. The Board erred in holding that "the claims on appeal simply specify that the bank will perform the bookkeeping and accounting services for its customers, rather than each customer performing his own."

27. The Board erred in holding that each data file in the appealed claims "is identified only as to its role in the bookkeeping and accounting system, in association with 'means' for performing conventional bookkeeping and accounting operations on the data files."

28. The Board erred in holding that the recitation of the claims "is without regard to the particular apparatus used to perform these operations and certainly with no 'enhancement' of the machine operation spelled out."

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***9a** 29. The Board erred in holding that there is "no essential difference in substance between the apparatus and process claims" and that they "must stand or fall together."

30. The Board erred in holding that the claims on appeal "would, in effect, grant a monopoly to appellant on a method of conducting the banking business."

31. The Board erred in holding that "banks would [by these claims] be restricted to the use of their data processing equipment only for their own bookkeeping and not being allowed to freely expand into the business of keeping books for their customers."

32. The Board erred in holding that the grant of these claims "would allow the intrusion of the patent sytem into the social sciences already under regulation by governmental agencies" and it "would exceed the constitutional grant of authority to issue patents in the 'technological arts'."

33. The Board erred in holding that the claims are unpatentable under 35 U.S.C. 103.

34. The Board erred in holding that the claims are "for obvious variations of ...the system of bookkeeping by banks that was acknowledged to be old by appellant on page 2 of the specification."

35. The Board erred in holding that the claims are "for obvious variations of ... the system of bookkeeping of the Dirks patent [U.S. 3,343,133] when applied to banking rather than industrial business."

36. The Board erred in holding that terms such as "special," "trust," "escrow," "personal" and the like are each "a category code as called for by the appealed claims" and that the bank's treatment of such accounts "is no different than appellant accords the different category codes."

***10a** 37. The Board erred in holding that appellant "merely adds the category number to the end of the account number to create, in effect, a series of different and distinct account numbers to be used during most of the data processing."

38. The Board erred in suggesting that appellant's invention is concerned with enabling banks to provide their customers "with a form of cost accounting facilities."

39. The Board erred in suggesting that appellant's invention is "merely printing the summary sheets for all the special accounts of an individual on a single document with totals for all accounts" and in holding that it "would be an obvious convenience to both the bank and the customer."

40. The Board erred in holding that the Dirks patent discloses a system in which "each area is assigned an account number in which transaction and balance files are kept and updated (column 9, lines 21-26)."

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41. The Board erred in viewing the apparatus and method covered by the claims as a "bookkeeping apparatus and method" and in holding that it would be "obvious to a person of ordinary skill to use the cost accounting portion of the Dirks system of bookkeeping in the banking ... business," and in suggesting that use would anticipate the claimed invention.

42. The Board erred in failing to construe appellant's claims in the light of appellant's disclosure, as required by 35 U.S.C. 112, last paragraph.

43. The Board erred in failing to interpret the claims "to cover the corresponding structure, material or acts described in the specification or equivalents thereof" as specified by 35 U.S.C. 112, last paragraph.

***11a** 44. The Board erred in disregarding the contribution to the art provided by appellant's invention and in holding it would be outside the patent laws as unpatentable subject matter.

45. The Board erred in not distinguishing between the claims of different scope and different subject matter and in holding all of them unpatentable for the same reasons as applied to the broadest claims.

Respectfully submitted,
/s/ Morton C. Jacobs
Morton C. Jacobs

December 23, 1971

Dann v. Johnston
1974 WL 175938

Briefs and Other Related Documents (Back to top)

• 1975 WL 173474 (Appellate Brief) Reply Brief for the Petitioner (Dec. 03, 1975)

• 1975 WL 173471 (Appellate Brief) Brief Amicus Curiae for Applied Data Research, Inc. (ADR) (Oct. 16, 1975)

• 1975 WL 173472 (Appellate Brief) Brief Amicus Curiae for the Association of Data Processing Service Organizations, Software Industry Association (ADAPSO SIA) (Oct. 16, 1975)

• 1975 WL 173465 (Appellate Brief) Brief for the Respondent (Oct. Term 1975)

• 1975 WL 173469 (Appellate Brief) Brief Amicus Curiae for California Patent Law Association. (Oct. Term 1975)

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• 1975 WL 173463 (Appellate Brief) Motion for Leave to File Brief Amicus Curiae and Brief Amicus Curiae for the Computer & Business Equipment Manufacturers Association (CBEMA) (Mar. 13, 1975)

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