CLAIMING COMPUTER-RELATED INVENTIONS AS ARTICLES OF MANUFACTURE

Victor Siber and Marilyn Smith Dawkins [n.a1]

INTRODUCTION

A claim drawn to a patented computer-related invention has been traditionally drafted in terms of the patented computer system and the method or process that the computer system performs in carrying out the invention. These system and method claims are appropriate for insuring protection for the entire system. However, some very meritorious computer-related inventions can be embodied within a discrete subcomponent of the computer system--a storage device embodying machine readable program code. The invention lies in the program control instructions of the storage device that cause a computer to perform new and non-obvious functions. Such storage devices embodying the computer- related invention are often made and sold or licensed separate and apart from the entire computer system.

Claims drafted in a form to read only on the discrete subcomponent, a program storage device embodying machine readable program code, more directly protects rights in the claimed invention from those who commercialize infringing devices. These commercialized products are articles of manufacture and/or machine subcomponents in and of themselves and should be claimed as such.

EXAMPLES OF THE CLAIM FORM

There may be many ways in which to claim these articles of manufacture. The following illustrates just two of the ways.

*14 CLAIM A

An article of manufacture [OR computer program product] comprising:
a computer usable medium having computer readable program code means embodied therein for causing a [GENERAL DESCRIPTION OF FUNCTION], the computer readable program code means in said article of manufacture [OR computer program product] comprising:
computer readable program code means for causing a computer to effect, [DESCRIPTION OF FIRST SPECIFIC FUNCTION];

computer readable program code means for causing the computer to [DESCRIPTION OF SECOND SPECIFIC FUNCTION "TIED" TO FIRST FUNCTION]; and

computer readable program code means for causing the computer to [DESCRIPTION OF THIRD SPECIFIC FUNCTION "TIED" TO FIRST AND/OR SECOND FUNCTION].

CLAIM B

A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for [DESCRIPTION OF GENERAL FUNCTION], said method steps comprising:

[LIST METHOD STEPS]....

OVERVIEW OF THE CLAIMS

The claimed invention is a computer program product that comprises a computer usable medium having new, useful, and nonobvious combination of "computer readable program code means" embodied thereon.   The claims are drawn to the computer program product itself having "program code means" in computer readable form on a computer usable medium and not to the internal processes carried out by a computer or the computer apparatus in its entirety.   The invention lies in the "program code means" of a computer program product.

As shown in CLAIM A above, the body of the claim is a self-contained description of the functional structure of the computer program product and/or article of manufacture referred to in the preambles of the claims.   The body of the claim completely defines the subject matter.   The preamble merely states the purpose or intended use of the subject matter of the body of the claim. [n.1] The claim can be read independently of the preamble and the preamble need not be read to give meaning to the claim.

The article of manufacture (computer program product), as claimed, necessitates that the "program code means" be in a machine readable *15 form and be embodied on a medium that can be used by a computer.   The claim specifically requires the program to be in a form capable of being directly used in a computer since the claim specifically recites a "computer usable medium" and "computer readable program code means embodied in the computer usable medium."   Computer usable media include magnetic diskettes, magnetic tapes, optical disks, Read Only Memory, Direct Access Storage Devices, etc. The computer program product is devised, made, and used as a component part of a machine utilizing optics, magnetic properties, and/or electronics to perform functions.   In essence, the computer program product is in the form in which it is typically made, licensed, and distributed.

In addition to the element in the claim reciting a "computer usable medium having computer readable program code means," all of the remaining elements are drafted in terms of "means for" performing a function under 35 U.S.C. § 112, sixth paragraph.

CLAIM B, above, is drafted in the preamble as an apparatus and/or article of manufacture, i.e., a program storage device, but the body of the claim is drafted in terms of process steps that are performed by the machine when the program of instructions embodied in the storage device are executed.   A computer program product is most efficiently defined by the functions which it causes a computer to perform.   Although the body of the claim is in the form of process steps, it is the computer readable storage device having computer executable instructions which is the subject matter of the claimed invention. The form of CLAIM B would also read on a magnetic tape, floppy disk, semiconductor chip, or similar program storage device containing the claimed elements. [n.2]

Patents have issued which have contained claims drafted to the computer program product, itself:
   U.S. Patent 4,853,962 (claim 10);
   U.S. Patent 4,864,492 (claims 10-14);
   U.S. patent 4,887,204 (claim 21);
   U.S. Patent 4,896,291 (claims 16-19);
   U.S. Patent 4,897,781 (claim 16);
   U.S. patent 5,057,935 (claims 13-14); and
   U.S. Patent 5,031,117 (claims 9-16).

*16 STRUCTURE OF A COMPUTER PROGRAM PRODUCT

  The structure of a computer program product can be defined both statically and dynamically.   The static structure is defined by the way in which the "program code means" are embodied within a computer usable medium.   For example, this static structure of a computer program product on a magnetic medium comprises the structure of the magnetic medium itself along with the magnetized and non-magnetized areas of the medium which represents the "program code means" of the computer program product.   For a computer program embodied within an optical disk, the structure comprises the structure of the optical disk itself along with the reflective and non-reflective areas of the optical disk which represents the "program code means" of the computer program product.   This static structure necessarily involves the structure of the computer usable medium itself and the way in which it embodies the "program code means" in machine readable form.

  However, a pure description of this static structure does not reveal the elements of the computer program product in a form readily understandable by the human mind.   One way to understand the static structure is to describe the static structure in terms of a high level programming language, in other words, human readable program code.   Still, the structure is only understood by those who understand that specific programming

language.   The static structure can be more generally comprehended through a description of the dynamic structure of the computer program itself, without regard to any specific medium.

  A functional dynamic description best defines the computer program product. This is because there may be many different static structures that can carry out the same functions of the computer program product.   Also, once a computer program product is read into a computer, portions of the computer program may be stored in separate places within the computer system.   The static structure then becomes somewhat disaggregated. A functional dynamic description of the structure defines the way in which the program operates.   Regardless of where an instruction may be stored, or what specific line of code is being executed next, it is the dynamic interaction of the various functional operations which defines the structure of the computer program product.

  The dynamic structure can be defined at various levels of detail.   This structure of the computer program product can be defined on a very high level in terms of the overall function or functions of a program down to a very low level of detail which defines the functional components of each line of code. Regardless of the level of detail at which the structure is defined, it is the functional interrelationship between components *17 that is important.   The higher level of functional interrelationship is typically shown through the use of flow charts, functional block diagrams, and pseudo code.   Lower levels of structure are defined by the use of more detailed flow charts, functional block diagrams, and pseudo code.   At the lowest level of detail, the actual program code listings are used to show the structure of the computer program product. It is important to note, however, that any one of these levels defines the structure of the computer program product.

  Likewise, no matter at what level the structure of a computer program product is defined, a programmer skilled in the art of programming can create the supporting levels of structure required to embody the program without undue experimentation.   The way in which a programmer will do this, i.e., the resulting structure at all levels of the computer program product down to the actual lines of code, will vary among programmers.   Some of the structure of the computer program product may be predetermined by the functional elements of the program.   In this case, this specific detail of structure may not vary greatly between different implementations.   On the other hand, some of the structure may be quite arbitrary if there are many ways to implement a specific level of function.

  Describing the structure of a computer program product is similar to describing the structure of a hardware invention.   A hardware invention may include the use of computer chips and associated discrete components to form the system of the invention. Each computer chip may include thousands of active devices.   Since there are so many active devices present in an electronic circuit, it is common to describe the structure of the circuit functionally in terms of functional block diagrams and functional descriptions. The structure of a hardware invention can likewise be defined through various levels of detail of the functional block diagrams and descriptions.   A person skilled in the art could readily, without undue experimentation, implement the described functions in

actual hardware components from the functional description of the structure.   It is important to note this similarity between the structure of a computer program product and the structure of hardware since many, if not all, software inventions could be implemented in hardware through various electronic devices and circuits.

Even though one may not be able to "see" the structure of a computer program on a disk with the naked eye, the structure can be seen with the aid of tools and technology. Likewise, although the structure of a chip with 260,000 circuits can not be seen with the naked eye, the structure of the chip can be seen with the aid of tools by magnification. In either of these cases, however, the structure can be readily conveyed *18 through a functional description.

The structure of this computer program product is claimed in a similar fashion as implementations in a hardwired circuit board are claimed.   The structure of inventions embodied in circuitry for causing a computer to perform certain functions are commonly claimed in terms of "means for" performing a function.   The claims of such hardwired inventions would also cover those same inventions where the sequence of controls are implemented by instructions in a Read Only Memory chip on a circuit board.   In fact, the claims presented above would also read on such implementations.

Computer program products do have "structure", but the "structure" of a computer program product is not usefully defined as a mere physical representation as it is for the mechanical arts.   The "structure" of a computer program product is usefully defined, as it is in the electrical arts, as the interrelationship of the program's functional components. It is in this way that the claims of a computer program product invention can particularly point out and distinctly claim the subject matter which an applicant regards as the invention, as required by the second paragraph of 35 U.S.C. § 112.

THE CLAIMED SUBJECT MATTER FALLS WITHIN AT LEAST ONE OF THE FOUR STATUTORY CLASSES UNDER 35 U.S.C. § 101

An invention may be patented only if it falls within one of the four statutory classes of subject matter of 35 U.S.C. § 101. [n.3] The Supreme Court in Kewanee Oil Co. v. Bicron Corp., also stated that " p rocesses, machines, manufactures, compositions of matter and improvements thereof, which meet the tests of utility, no velty, and nonobviousness are entitled to be patented." [n.4] The claimed computer program product falls within the statutory class of an article of manufacture which is one of the four statutory classes of subject matter of 35 U.S.C. § 101, and therefore, any such claimed invention is entitled to be patented if it meets all the remaining tests of patentability, such as utility, novelty, and nonobviousness.

The claims are apparatus claims and, therefore, to be patentable subject matter, the claimed subject matter must fall within one of the three section 101 classes of "machine, manufacture, or composition of matter." The claims do not define a "composition of matter" as that term has been used previously by the courts.   Since the definition of

"machine" *19 and the definition of "an article of manufacture" are not clearly and distinctly defined in all circumstances, the claims may also define a "machine." In his treatise, Donald S. Chisum states:

Three of the four classes of statutory subject matter of utility patents (machines, manufactures, and compositions of matter) relate to structural entities and can be grouped as "product" claims in order to contrast them with process claims.... An applicant who claims a product is not required to state whether it is a machine, manufacture, or composition of matter. Diamond v. Chakrabarty, 100 S.Ct. 2204, 206 U.S.P.Q. 193 (1980) (respondent's claim is to a nonnaturally occurring manufacture or composition of matter). Nestle-Le Mur Co. v. Eugene, Ltd., 55 F.2d 854, 848, 12 U.S.P.Q. 335, 338 (6th Cir.1932) (little prejudice could result from an inventor's indecision as to whether his invention should properly be the subject of a patent for a machine or an article of manufacture or a composition of matter. These three subjects of patents are in a true sense all products or articles, but all differ fundamentally in nature from a process). [n.5]

Chisum further states that the three product classes exhaust all the kinds of structural entities made by mankind. [n.6] Finally, he states that a manufacture "is the residual class of 'product' patent--encompassing all man-made items not found in substantially the same form in nature that are neither machines nor compositions of matter." [n.7]

A computer program product must necessarily be either a machine, an article of manufacture or a composition of matter since by definition these three product classes exhaust all the structural entities made by mankind and computer program products are indeed structural entities made by mankind. Therefore, by definition, computer program products fall into at least one of the four statutory classes.

DEFINITION OF A MACHINE

Depending upon the various definitions of "machine," [n.8] a computer program product could indeed fall into this second class of machine since a computer program product is an element of the entire computer.

DEFINITION OF AN ARTICLE OF MANUFACTURE

"A 'manufacture' is recognized as a residual class of 'product' statutory subject matter intended to encompass all man-made items that are *20 neither machines nor compositions of matter." [n.9]

It is being asserted that computer program products are articles of manufacture in order to clearly distinguish that what is being claimed is not the entire computer machine as a whole nor the computer processes performed by the computer apparatus, but an element of the entire machine, the computer program product.

According to Chisum, the definition of "manufacture" can be traced as far back in legal history as the English Statute of Monopoly of 1623 and construed by the English courts as a vendible product of inventive skill. [n.10] Computer program products clearly are a vendible product and do involve considerable amounts of innovation and creativity on the part of programmers.

An applicant is not required to state which statutory class the invention may fall into, i.e., whether the invention is a machine, manufacture, or composition of matter. Even if an applicant is indecisive, no prejudice should result since all are in the true sense "products" or "articles", as discussed above.

The Supreme Court defined articles of manufacture in Diamond v. Chakrabarty, [n.11] as "the production of articles for use from raw materials prepared by giving to these materials new forms, qualities, properties, or combinations whether by hand labor or by machinery." [n.12] A computer program product or "program code means" embodied in any tangible form, i.e., magnetic media, optical media such as optical disks, or other physical media such as punched tape, etc., clearly gives that media a new quality as required by the definition of "manufacture" relied upon by the Supreme Court in Diamond v. Chakrabarty. The claimed invention specifically claims a tangible physical form and structure in the words "a computer usable medium having computer readable program code means embodied in said medium." In addition, the "program code means" have a tangible physical form and structure as discussed above. The claimed computer program product does not lack any fundamental property of an article of manufacture.

As shown above, the claims fall within at least one of the four statutory classes of section 101. The claims particularly point out and distinctly claim "an article of manufacture," "a computer program product," or a "program storage device" all of which clearly fall into the definition of either an article of manufacture or a machine under 35 U.S.C. § 101.

*21 Any such invention could be claimed, also, in terms of the entire computer system and method for carrying out a new computer process. Such system and method claims fall within the statutory classes. Even though the invention can be claimed under these other statutory classes does not mean that one cannot also claim an invention under another statutory class. As stated in In re Kuehl: [n.13]
   We believe the constitutional purpose of the patent system is promoted by encouraging applicants to claim, and therefore to describe in the manner required by 35 U.S.C. § 112, all aspects of what they regard as their inventions, regardless of the number of statutory classes involved. [n.14]

Since the invention lies not only in the computer processes and the computer apparatus, but in the commercialized computer program product itself, the invention should be claimed under any applicable statutory class so that all aspects of commercialization can be protected by patent. Not only should one have the freedom to claim their invention in any number of ways in order to get full protection for their invention, but at the very least

one should have the right to claim their invention in a way that protects the invention as it is actually commercialized.

CLAIMING ARTICLES OF MANUFACTURE IN TERMS OF FUNCTIONS TO BE CARRIED OUT IN AN ASSOCIATED DEVICE

Articles of manufacture are commonly claimed in terms of means for effectuating a desired result in an associated device not otherwise claimed. [n.15] Even though articles of manufacture and machine subcomponents, as claimed, typically do not "do anything" until the article is used as intended, this does not mean, however, that one cannot claim such article in terms of the functions that it is intended to carry out. The structure of such articles are usually most distinctly defined and claimed in terms of such functions. For example, the unique structure of the configuration of a cam can be defined in terms of the function that such a cam produces in a mechanical device that it governs. The structure of such a cam would be claimed in terms of "means for" performing such a function in an associated mechanical device. This is true, even though the claim is drawn only to the cam, and not also, to the associated mechanical device.

*22 The fact that the claimed computer program product does not "do anything" until it is used as intended does not affect its patentability. Many devices are separately claimed that do not "do anything." For example, claims drawn to circuitry do not "do anything" until the circuitry is used in conjunction with other devices. A computer circuit board does not "do anything" until it is plugged into the computer. In fact, a computer does not "do anything" until it is programmed.

The structure of the computer program product is in itself new, useful, and nonobvious, and it is the structure of this article of manufacture that is being described and claimed in terms of the functions which the article of manufacture causes a device, i.e., a computer, to perform. The claims comprise a new, useful, and nonobvious combination of means for causing a certain effect in a computer. This is an accepted way of describing and claiming articles of manufacture. [n.16] Articles of manufacture can be properly claimed in terms of the functions or results that are imparted to a device not otherwise included in the claim. There is no requirement to also claim the associated device, the computer, on which the functions are performed. [n.17]

STATUTORY SUBJECT MATTER UNDER 35 U.S.C. § 101

In re Pardo, [n.18] is often cited for the position that "any process, machine, manufacture, or composition of matter constitutes statutory subject matter unless it falls within a judicially determined exception to section 101." [n.19]

However, the Supreme Court of the United States, in Diamond v. Chakrabarty and Diamond v. Diehr, [n.20] noted that Congress intended that "anything under the sun that is made by man" is included within the ambit of 35 U.S.C. § 101. [n.21] The claimed

invention is drawn to an article of manufacture that is clearly made by man, falling within the ambit of 35 U.S.C. § 101.

*23 In addition, the Supreme Court in both of these decisions stated that "courts 'should not read into the patent laws limitations and conditions which the legislature has not expressed.' " [n.22]

The Supreme Court in Diamond v. Diehr, recognized only certain exceptions as follows: "[e]xcluded from such patent protection are laws of nature, physical phenomena and abstract ideas." [n.23]

The claimed article of manufacture, i.e., the computer program product, does not fall within any of these categories. It clearly is not a law of nature, a physical phenomena or a mere abstract idea.

"Computer readable program code means" on a computer usable medium exists concretely in many forms, including but not limited to, a concrete existence on magnetic, optical, or electronic storage devices. Electrical signals, magnetic effects, sound waves, light, etc.--none of these forms is "abstract." The article of manufacture in the claimed environment of use produces physical results when sensed by an instrument or a mechanism in a device such as a computer. This attribute affirms the physical nature of the article claimed and removes it from the realm of a mere abstract idea.

An article which may be sensed and then sets in motion a mechanical or electrical response is a physical structure clearly falling within the ambit of statutory subject matter under 35 U.S.C. § 101, as that section has been interpreted by the Supreme Court of the United States.

ANALYSIS OF THE PRINTED MATTER DOCTRINE

A judicially created printed matter exception to patentability has existed in prior case law. In light of the United States Supreme Court decision in Diamond v. Diehr which recognized only "laws of nature, physical phenomena, and abstract ideas" as being excluded from the patent laws, and the statement in the United States Supreme Court decisions in Diamond v. Diehr and Diamond v. Chakrabarty which warned that "courts should not read into the patent laws limitations and condition which the legislature has not expressed"; it is unclear whether the printed matter doctrine still exists today. Some may construe that the printed matter doctrine exists under the exception of "abstract ideas." [n.24]

Even if the printed matter doctrine does exist, the claimed computer *24 program product does not fall within the realm of such a doctrine. This is true even if one were to analogize the physical embodiments of the "program code means," i.e., the magnetized and non-magnetized areas on a disk, etc., as printed matter; or to broadly read the claimed invention to cover a higher level programming language representation of the

"program code means" which is more easily understood by humans and which could be read by a computer equipped with optical readers. An analysis of the case law under the printed matter doctrine will illustrate that a computer program product does not fall within this printed matter doctrine.

It is important to note that some of the case law has analyzed certain fact situations under the printed matter doctrine with respect to statutory subject matter (under 35 U.S.C. § 101) and some of the case law has analyzed certain fact situations under the printed matter doctrine with respect to whether the differences between the claimed subject matter including the printed matter were sufficient over the prior art to find patentability (under 35 U.S.C. § § 102 and 103).

PRINTED MATTER DOCTRINE UNDER 35 U.S.C. § 101

In analyzing whether a claim was drawn to statutory subject matter under the printed matter doctrine, the underlying requirement was a demonstration that the claims were drawn to something physically new or to new physical structures of printed matter, and not to a "mere" arrangement of printed matter, "mere" printed matter, or printed matter "itself." [n.25]

"Mere" is defined as "nothing more than what is specified." [n.26] Since the computer program product claims discussed herein, drawn to an article of manufacture for functionally controlling the operation of a machine, are drawn to physical structure, this is more than "mere" printed matter.

Similarly, the CCPA in In re Jones, [n.27] held that claims drawn to a code disc (having transparent areas where light shines through and opaque areas) were statutory subject matter. [n.28] What the PTO deemed to be printed matter in the disc, the CCPA deemed to be structure.

*25 That claim, and the others likewise, do not, in our opinion, define "printed matter" in the sense in which that term has heretofore been used to indicate various sorts of indicia whose primary purpose is the conveying of intelligence to a reader. What we find on the disc we would not characterize as indicia or printing but as structure.... [n.29]

The CCPA further stated:

The disc is devised, made and used as a component part of a machine utilizing optics and electronics to perform functions of which we are not fully apprised by the record. We think it is error to confuse the lines on a patent drawing, which may have the appearance of "printed matter," with functional elements of a mechanism which in use actuate other mechanisms or electrical circuits or devices intended to be illustrated by the drawing. [n.30]

The case law on printed matter clearly shows that if the claimed invention is drawn to physical structure; or the primary purpose of the claimed invention is not to convey intelligence to a human but to control the operation of a machine; or the claimed

invention requires that the information be processed not by the mind but by a machine; or the claimed invention claims functional elements which in use actuate other mechanisms or electrical devices, then more than "mere" printed matter is being claimed and the claims are statutory.

In addition, the printed matter doctrine is not applicable to the claimed invention because no specific "expression" of the invention is being claimed. The claims, as drafted, protects the functional aspects of the claimed "computer readable program code means," rather than any specific "expression" of the "computer readable program code means." These type of claims are analogous to the claims in Ex parte Gale, [n.31] wherein the claimed features were independent of the ornamental effect of a decorative tile surface. The claims in Ex parte Gale, covered a *26 multitude of different designs but the claimed invention in no way defined "a particular pattern of design." [n.32] Likewise, with respect to the claimed computer program product, a multitude of different expressions of the program code could be written, but the functional features of the claimed invention are independent of any particular copyrightable expression of the computer program product.

Even though the above analysis clearly shows that the computer program product is not "mere" printed matter under the printed matter doctrine, and is, therefore, statutory subject matter, the determination of statutory subject matter should be based upon the wording of the statute and the interpretation placed on it by the Supreme Court of the United States.

For example, the PTO Board of Patent Appeals and Interferences in Ex parte Carver, [n.33] held that the claims, which defined a sound recording (and which contained signals that caused new functional effects in an associated device not claimed), "when considered as a whole, are manifestly drawn to an article of manufacture, a category of invention expressly defined by 35 U.S.C. § 101 as eligible for patent protection, and not merely to a sound pattern." [n.34] In assessing the issue under 35 U.S.C. § 101, the Board focused on Diamond v. Diehr, emphasising that a "claim as a whole" approach must be used when determining whether the subject matter of a claim falls within the 35 U.S.C. § 101 categories of statutory subject matter. [n.35] The Board also found further guidance in the proper interpretation of 35 U.S.C. § 101 in Diamond v. Chakrabarty, which emphasized that Congress plainly contemplated that the patent laws be given wide scope and to "include anything under the sun that is made by man." [n.36]

The approach taken by the PTO Board of Appeals in Ex parte Carver, in analyzing articles of manufacture under 35 U.S.C. § 101 is correct, and the same such analysis and conclusion should be made with respect to computer- related inventions claimed as articles of manufacture.

PRINTED MATTER DOCTRINE UNDER 35 U.S.C. § § 102 AND 103

In re Miller, [n.37] is often cited for the quote "printed matter by itself is nonstatutory." [n.38] This one line in the opinion is merely a summary of *27 the older printed matter case law discussed above and is not the holding of In re Miller.   The claims in In re Miller were drawn to a measuring receptacle with quantity measuring indicia thereon different from the volume of the receptacle. [n.39] The claimed invention was a combination of three elements constituting a manufacture under 35 U.S.C. § 101.   Since the claims were statutory, the issue became one of novelty and nonobviousness under 35 U.S.C. § § 102 and 103.   The CCPA in In re Miller held that the claims were patentable under 35 U.S.C. § § 102 and 103 over the prior art measuring receptacles. [n.40]

Since the "claim as a whole" must be analyzed under a 35 U.S.C. § 101 determination and such analysis usually results in the claim being statutory subject matter as a machine or an article of manufacture, the approach taken has been to reject claims that include printed matter under a novelty determination under 35 U.S.C. § 102 or a nonobviousness determination under 35 U.S.C. § 103, as was the approach in In re Miller. The issue then becomes one of whether the "printed matter" is to be given patentable weight in such determinations.

However, if printed matter is not given patentable weight, and not considered in the novelty and obviousness determinations then, in essence, the claim is not being analyzed as a whole under 35 U.S.C. § § 102 and 103. Title 35, section 103 specifically requires that "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...." (emphasis added). Therefore, any such determination as to whether or not elements of a claim are to be given patentable weight under a 35 U.S.C. § § 102 or 103 determination is contrary to the statutory requirements of analyzing the subject matter as a whole.

In fact, in In re Gulack, [n.41] the Court of Appeals of the Federal Circuit stated:
   A "printed matter" rejection under 103 stands on questionable legal and logical footing.   Standing alone, the description of an element of the invention as printed matter tells nothing about the differences between the invention and the prior art or about whether that invention was suggested by the prior art.   A printed matter rejection is based on case law antedating the 1952 patent act, employing a point of novelty approach. In re Sterling, 70 F.2d 910, 21 U.S.P.Q. 519 (CCPA 1934).   The 1952 act legislatively revised that approach through its requirement that the claim be viewed as a whole in determining obviousness. Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966).   The CCPA has considered all of the limitations *28 of the claims including the printed matter limitations, in determining whether the invention should have been obvious.   See In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974); In re Cavrich, 451 F.2d 1091, 172 U.S.P.Q. 121 (CCPA 1971).   In Royka, 490 F.2d at 985, 180 U.S.P.Q. at 583, the CCPA, notably weary of reiterating this point, clearlystated that printed matter may well constitute structural limitations upon which patentability can be predicated. [n.42]

To illustrate: if the subject matter of the claimed computer program product is not analyzed as a whole, and the "program code means" are not given patentable weight, any

such conclusion that "any given computer program product is obvious over all other computer program products, and is obvious over the well known data processing technique of storing program code means on storage media for later use by a computer," is illogical and is not legally sound. The computer program product claims are not merely claiming the admittedly old technique of merely storing a computer program on a medium.   The claimed invention should be patentable under 35 U.S.C. § 103 because of the new, useful, and nonobvious combination of "program code means" recited in the claims, and the novel computer control operations achieved as a result of such "code means."   All of the "program code means" should be given patentable weight in determining whether or not the claimed computer program product is nonobvious under 35 U.S.C. § 103 over prior art computer program products.

  It should be noted that the underlying fact situations of some of the case law [n.43] have been relied upon to show that before "printed matter" can be given patentable weight, there must be a new "structural" relationship between the printed matter and the substrate embodying the "printed matter." The argument that "there is no 'new' structural relationship between program code means recorded on the substrate; all programs are recorded on the substrate in the same way as any other program, so therefore, the program code means is not given patentable weight in an obviousness determination" is in error for the following reasons.   First, such approach does not analyze the "subject matter as a whole," as discussed above.   Second, the technology of the claimed computer-related invention as an article of manufacture is not similar to the technology underlying the fact situations of the other "printed matter" case law, and therefore, should not be limited to those fact situations. Third, if there is any requirement, it is merely that the "printed matter" have structural or physical limitations upon which patentability can be predicated.

  *29 A precise structural relationship between "printed matter" and the substrate as found in the underlying fact situations of some of the "printed matter" case law is not required before patentable weight is given to the "printed matter."   The fact situation in In re Gulack did not meet the precise type of functional relationship set forth in In re Miller, and therefore, the functional relationship test was not dispositive of the issue of obviousness. Instead, a different type of functional relationship was found.   Likewise, merely because a claimed computer program product may not show the same type of structural relationships as the structural relationships in the underlying fact situations of some of the "printed matter" case law, should not be dispositive of obviousness.   The court in In re Gulack, stated:
   [W]hat is required is the existence of differences between the appealed claims and the prior art sufficient to establish patentability. The bare presence or absence of a specific functional relationship, without further analysis, is not dispositive of obviousness. [n.44]

  The patent statute requires that the invention as a whole be nonobvious, not that certain relationships be shown among the elements of the invention before patentable weight may be given to all of the elements.   In addition, any such additional requirement is contrary to the Supreme Court's position that "courts 'should not read into the patent laws limitations and conditions which a legislature has not expressed.' " [n.45]

Nevertheless, the claimed "computer readable program code means" do indeed have structural limitations upon which patentability can be predicated. There are structural limitations as illustrated by the functional relationship among the "program code means" themselves and as illustrated by the new functional relationship between the "program code means" and a device (the computer) using the computer usable medium embodying the "computer readable program code means," as more fully discussed and described above. The "computer readable program code means" is physical structure as evidenced by the new functional and physical result it causes in a computer.

Some examples of the "printed matter" case law which held claims to be patentable are as follows:

In In re Miller, the CCPA responded to the examiner's statement that the claimed indicia and legend do not produce the required cooperative "structural" relationship necessary before the printed matter can be given patentable weight by stating:
    *30 We do not see that "structural" relationship--whatever that means-- is required to obtain the practical problem-solving results of appellant's invention. In fact, it is apparent that such restrictions as the examiner insists on would deprive the ... embodiment of the invention of protection.... It seems to us that what is significant here is not structural but functional relationship.... This specifies the required functional relationship to carry out appellant's invention and clearly defines the disclosed invention as required by section 112. [n.46]

In In re Royka and Martin, [n.47] the claimed invention was directed to a device in the nature of an answer sheet for use in self instruction and testing. The court stated " p rinted matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter in In re Jones, 373 F.2d 1007, 153 U.S.P.Q. 77 (1967); and In re Miller, 418 F.2d 1392, 164 U.S.P.Q. 46 (1969), and will not repeat ourselves." [n.48]

In Ex parte Gale, [n.49] the Patent Office Board of Appeals stated " w here, however, the printed matter cooperates with the other aspects pertaining to utility, so as to give a new and beneficial result, which advantageous result has never been obtained before, invention is present." [n.50] In Ex parte Harrington, [n.51] where the specific appearance of symbols and characters aided in the detection of forgery, the Patent Office Board of Appeals stated "these features have distinct mechanical advantages in the detection of forgery and the examiner does not contend that the references show these features." [n.52]

Not only does a computer program product have structure, but the "computer readable program code means" has structure through the interrelatedness of its functional components. The claims specify this required functional relationship to carry out the invention. Therefore, "program code means" do constitute structural limitations upon which patentability can be predicated.

A case directly on point, Ex parte Lang, [n.53] involved a record card for controlling the operation of accounting machines. The Board stated " i t is clear that the present claims are drawn to actually cover physical *31 structure and are not in our opinion rejectable as merely covering printed matter." [n.54]

The "program code means" is not like "printed matter." The "p rogram code means" has distinct structure itself. The structure of the manufacture is defined by both the physical structure of the "computer readable program code means" on the computer usable medium and also by the functional interrelationship of its program code means. In addition, since the functional elements of the "program code means" are capable of activating and controlling the action of a machine, the computer, in a specified manner, the "program code means" must necessarily be structure and be given patentable weight. The claimed article of manufacture differs from a substrate without the "program code means" in a meaningful manner in the same way a cam having a particular configuration differs from an unconfigured blank. There is no basis for not giving the "program code means" patentable weight in determining the differences between the claimed invention and prior art computer program products under 35 U.S.C. § 102 and 35 U.S.C. § 103.

NO BASIS EXISTS FOR NOT ALLOWING CLAIMS DRAWN TO A COMPUTER PROGRAM PRODUCT

There has been no court ruling that a computer program product is not patentable. [n.55]

The CCPA in In re de Castelet, [n.56] stated, " a bsent contrary directions, no basis exists for a moratorium on protection of inventions embodying or using computer programs. Such broad prohibition could subject meritorious statutory invention to unabatable piracy, and could forestall invention disclosure, the hallmark of the patent system, until Congress chooses to act." [n.57]

If a computer-related invention lies within a computer program product, an inventor is entitled to a patent claiming such computer program product as a matter of right. The CCPA in In re Stempel [n.58] stated:
    The patent statutes give to inventors the right to a patent upon compliance with their provisions, and neither the rules promulgated by the Patent Office nor the interpretation placed upon them can detract from these rights. [n.59]

 *32 Not only should patents be granted on computer program products because there is no basis not to, but patents should be granted on computer program products because there are good reasons to do so.
    Computer software--a cornerstone of the world's current information age--is one of America's leading industries. Indeed, it is the only sector of the U.S. electronics industry that has retained a competitive "lead" in the world market.... With world software sales predicted to reach $1 trillion by the year 2000, software firms could be one of the biggest manufacturing sectors in the United States by the end of the decade.... If American software firms are to continue their world market share expansion and retain their

competitive lead, one of their principal challenges is to slow the spread of software infringement around the globe.... As global competition for product innovation and new markets becomes keener, industry relies more heavily on the protection of intellectual property rights. [n.60]

  Software has been identified as one of the critical technologies driving the American economy in the report from the Council of Competitiveness, Gaining New Ground: Technology Priorities for America's Future.   The report reflects the strong conviction of leading American private-sector executives that unless the nation acts immediately to promote its position in the critical technologies, U.S. technological competitiveness will erode further, with disastrous consequences for American jobs, economic growth and national security.   U.S. industry is currently succeeding in fields such as computer software that rely heavily on individual ingenuity. [n.61] The report stated that software was critical to every industry that was studied under the report. [n.62] Software technology has also been identified as a critical technology by the U.S. Department of Commerce, the U.S. Department of Defense, the Japanese Ministry of International Trade and Industry (MITI) and the European Community. [n.63]

   Advances in computers and software have driven major changes in virtually every other sector of the U.S. economy and are also critical to the national defense.   U.S. computer system firms are still the dominant producers in world equipment and software markets, but U.S. leadership is under assault. The U.S. balance of trade has deteriorated substantially in the last decade.... The United States leads the world in highly creative technologies such as software, networks and communications, and computer architecture.... Continued success in the knowledge-intensive parts of the industry depends on ... effective intellectual property protection.... [n.64]

  *33 In the article Can the U.S. Stay Ahead In Software, the following facts were stated:
   When it comes to computer software, the U.S. is unquestionably where the action is. While the U.S. has seen its lead in microchips, consumer electronics, and many kinds of computer hardware slip away, it has maintained a huge advantage in software.   American companies command nearly 60% of the world's $110 billion market for software and related services, according to International Data Corp.   All told, more than 1.2 million programmers and software engineers work in the U.S., plus nearly 200,00 more people employed in related jobs at thousands of software companies, according to the U.S. Labor Dept.
        The software lead does far more than create a vibrant domestic industry.   High-quality software is key to running everything from personal computers to Patriot missiles. In automated factories, stock exchanges, banks, airlines, and just about every other business, America's software edge is helping. "Our strength in software is compensating for our weakness in other areas."
        America's rivals are investing billions to build up their own software capabilities.... "The auto industry is gone, and the computer industry is gone.   The only industry we have a leadership position in is software. And I think we're losing that like all the others."   Brad Cox, co-founder of Stepstone Corp., a supplier of advanced software for workstations.

Such entrepreneurs [Philippe Kahn, William Gates] have kept the U.S. far ahead. With a penchant for risk-taking and access to venture capital, they have nurtured the creative spark that leads to advancement in technology.

[W]herever you go, from Japan to Germany, from Canada to Singapore, America's rivals are investing billions to build their own software capabilities. [n.65]

It is clear from the above that computer software program products have great value in the real world. Software is a over a hundred billion dollar industry. The CCPA in In re Ruschig, [n.66] stated " o ur view, in brief, is that the basic principle of the patent system is to protect inventions which meet the statutory requirements. Valuable inventions should be given protection of value in the real world of business and the courts." [n.67]

The value of the software industry in the real world includes the value of these commercialized computer program products. If invention lies in the computer program product as well as in the computer process and the computer apparatus, then each of these should be patentable. In this way, the inventor's true invention is distinctly claimed by the scope and breadth of the claimed invention.

*34 CONCLUSION

Some computer-related inventions are embodied within a discrete subcomponent of a computer, such as a storage device embodying machine readable program code, and can be made and sold (licensed) separate from the computer. Since the computer-related invention lies not only in the computer processes and the computer apparatus, but in the commercialized computer program product itself, the invention should be claimed under any applicable statutory class so that all aspects of commercialization can be protected by patent. Not only should one have the freedom to claim their invention in any number of ways in order to get full protection for their invention, but at the very least one should have the right to claim their invention in a way that protects the invention as it is actually commercialized.

To protect rights in the computer-related invention as it is actually being commercialized, a patent claim should be drawn to this article of manufacture itself, i.e., the computer program product. Such a claim can be drafted in terms of a combination of a computer usable medium having a combination of computer readable program code means embodied in the medium for causing a computer to carry out various functions.

The claimed article of manufacture is statutory subject matter under 35 U.S.C. § 101. The Supreme Court in Diamond v. Chakrabarty, and Diamond v. Diehr, has broadly interpreted 35 U.S.C. § 101 as Congress has intended. Even if the claimed article of manufacture were to be analyzed in light of the "older" printed matter case law with respect to 35 U.S.C. § 101, the claimed invention would still be patentable because of the physical structure of the claimed "computer readable program code means" as evidenced by the physical result it produces when sensed by an instrument or a mechanism in a device such as a computer.

The claimed "computer readable program code means" distinguishes the claimed invention from other computer program products.   If the subject matter as a whole is analyzed for nonobviousness under 35 U.S.C. § 103 as required by the statute, then previous case law with respect to the printed matter doctrine under 35 U.S.C. § 103 is irrelevant.   A determination of whether certain claimed elements can be given patentable weight in determining nonobviousness stands on questionable legal and logical footing. Nevertheless, in determining whether or not the "program code means" could be given patentable weight under the printed matter doctrine with respect to 35 U.S.C. § 103, the physical structure of the "program code means" as described above, mandates that the "program code means" be given patentable weight in a determination under 35 U.S.C. § 103.

  *35 A computer-related invention claimed as an article of manufacture is statutory subject matter and does not fall within the printed matter doctrine as it has been applied under 35 U.S.C. § § 101, 102 or 103.

  A claimed computer-related invention meets the statutory requirements and should be protected by patent as a matter of right.   If invention lies in the computer program product as well as in the computer process and the computer apparatus, then each of these should be patentable.   In this way, the inventor's true invention is distinctly claimed by the scope and breadth of the claimed invention.

[n.a1]. Victor Siber is Senior Corporate Counsel for IBM Corporation. Marilyn Smith Dawkins is Intellectual Property Law Counsel for IBM Corporation.

  This paper reflects the views of the individual authors, and does not necessarily represent the views of the IBM Corporation.

[n.1]. Kropa v. Robie et al., 187 F.2d 150, 151, 88 U.S.P.Q. 478, 480, 481 (C.C.P.A.1951).

[n.2]. ABA PCTS Comm. 701 MPEP Revs Draft 12-5-90.   See also The Law and Business of Computer Software (D.C. Toedt III ed. Clark Boardman Company, Ltd. Release # 1. 1990).
  A claim of such similar form has been issued in U.S. Patent 4,853,962 (see claim 10 of patent), August 1, 1989.

[n.3]. Kewanee Oil Co. v. Bicron Corp. et al., 416 U.S. 470, 483, 181 U.S.P.Q. 673, 679 (1974).

[n.4]. Id.

[n.5]. 1 Donald S. Chisum, Patents, § 1.02 (Matthew Bender 1994).

[n.6]. Id.

[n.7]. Id. at § 1.02[3].

[n.8]. See Id. at § 1.02[2] (an invention pertaining to a machine may be divided into four classes, the first being where the invention embraces the entire machine, such as a sewing machine (or in this case a computer), the second being where the invention embraces one or more elements of a machine but not the entire machine such as the coulter of the plough....).

[n.9]. Id. at § § 1.02 and 1.02[3].

[n.10]. Id. at § 1.01.

[n.11]. 447 U.S. 303, 206 U.S.P.Q. 193 (1980).

[n.12]. Id. at 308, 206 U.S.P.Q. at 196-197.

[n.13]. 475 F.2d 658, 177 U.S.P.Q. 250 (C.C.P.A.1973).

[n.14]. Id. at 666, 177 U.S.P.Q. at 256.

[n.15]. See e.g., In re Stencel, 828 F.2d 751, 4 U.S.P.Q.2d 1071, 1072 (Fed.Cir.1987) (reference to claim 1).

[n.16]. See e.g., Ex parte Carver, 227 U.S.P.Q. 465 (Bd.App.1985) (The claim was directed to an article of manufacture, i.e., a sound recording, and the sound recording was claimed in terms of the effect that it would produce in a sound recording responsive device.)

[n.17]. See Ex parte Blackie, Maleski, Newell, and Vogel, 189 U.S.P.Q. 318 (Bd.App.1974) (A claim was drawn to a tape containing a signal for reversing the tape in an associated tape transport system. Only the tape was claimed. The associated transport system was not claimed. The decision stated "there is no duty upon appellants to claim more than what they regard as their invention.").

[n.18]. 684 F.2d 912, 214 U.S.P.Q. 673 (C.C.P.A.1982).

[n.19]. Id. at 916, 214 U.S.P.Q. at 677.

[n.20]. 447 U.S. 303, 206 U.S.P.Q. 193 (1980); 450 U.S. 175, 209 U.S.P.Q. 1 (1981).

[n.21]. See S.Rep. No. 1979, 82 Cong., 2d Sess., 5 (1952); H.R. rep. No. 1923, 82d Cong., 2d Sess., 6 (1952).

[n.22]. Chakrabarty, 447 U.S. at 308, 209 U.S.P.Q. at 196; Diehr, 450 U.S. at 182, 209 U.S.P.Q. at 6.

[n.23]. Diehr, 450 U.S. at 185, 209 U.S.P.Q. at 7.

[n.24]. See Boggs v. Robertson, 13 U.S.P.Q. 214 (D.C.1931) ("The authorities are uniform in holding printed matter per se to be unpatentable, i.e., where an idea is simply an abstraction the mere reduction of it to writing does not amount to invention.").

[n.25]. See Kieferle v. Kingsland, 79 F.Supp. 700, 78 U.S.P.Q. 60 (D.D.C.1948), aff'd. 178 F.2d 728, 83 U.S.P.Q. 442 (D.C.Cir.1949); In re Rice, 132 F.2d 140, 56 U.S.P.Q. 173 (C.C.P.A.1942); In re Reeves, 62 F.2d 199, 16 U.S.P.Q. 110 (C.C.P.A.1932).

[n.26]. The American Heritage Dictionary of the English Language (William Morris ed., Houghton Mifflin Company, 1981).

[n.27]. 373 F.2d 1007, 153 U.S.P.Q. 77 (C.C.P.A.1967).

[n.28]. Id. at 1013, 153 U.S.P.Q. at 82.

[n.29]. Id. at 1012, 153 U.S.P.Q. at 80-81.

[n.30]. Id. at 1013, 153 U.S.P.Q. at 82.   See also Ex parte Harrington, 51 U.S.P.Q. 235 (Bd.App.1941) which stated:
    "The examiner has rejected the claims also on the ground that they are directed to mere printed matter.   We believe the mechanical advantages of applicant's arrangement are such as to take this case out of the class of cases condemning patents on mere printed matter."
Id. at 236 (emphasis added).   See also In re Bernhart and Fetter, 417 F.2d 1395, 163 U.S.P.Q. 611 (C.C.P.A.1969) wherein the court stated:
    "Nor are the 'printed matter' cases, cited by the board, supra, controlling as to these apparatus claims either on the facts or in principle.   On their facts, those cases dealt with claims defining as the invention certain novel arrangements of printed lines or characters, useful and intelligible only to the human mind.Here the invention as defined by the claims requires that the information be processed not by the mind but by a machine, the computer,...."
Id. at 1399, 163 U.S.P.Q. at 615 (emphasis added).

[n.31]. 106 U.S.P.Q. 420 (Bd.App.1955).

[n.32]. Id. at 422-423.

[n.33]. 227 U.S.P.Q. 465 (1985).

[n.34]. Id. at 467.

[n.35]. Id.

[n.36]. Id.

[n.37]. 418 F.2d 1392, 164 U.S.P.Q. 46 (C.C.P.A.1969).

[n.38]. Id. at 1396, 164 U.S.P.Q. at 49 (emphasis added).

[n.39]. Id. at 1393, 164 U.S.P.Q. at 47.

[n.40]. Id. at 1396, 164 U.S.P.Q. at 49.

[n.41]. 703 F.2d 1381, 217 U.S.P.Q. 401 (Fed.Cir.1983).

[n.42]. Id. at 1385, fn. 8, 217 U.S.P.Q. at 403, fn. 8.

[n.43]. See In re Miller, supra note 37, and In re Gulack, supra note 41.

[n.44]. Gulack, 703 F.2d at 1386, 217 U.S.P.Q. at 404 (emphasis added).

[n.45]. Supra note 22.

[n.46]. Miller, 418 F.2d at 1395-1396, 164 U.S.P.Q. at 48 (emphasis added).

[n.47]. 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A.1974).

[n.48]. Id. at 985, 180 U.S.P.Q. at 583.

[n.49]. 106 U.S.P.Q. 420 (Bd.App.1955).

[n.50]. Id. at 424.

[n.51]. 51 U.S.P.Q. 235 (Bd.App.1941).

[n.52]. Id. at 236.

[n.53]. 56 U.S.P.Q. 423 (Bd.App.1942).

[n.54]. Id. at 425.

[n.55]. See Gottschalk, Comr. Pats. v. Benson et al., 409 U.S. 63, 175 U.S.P.Q. 673 (1972) ("it is said that the decision precludes a patent for any program servicing a computer.   We do not so hold." (emphasis added)).

[n.56]. 562 F.2d 1236, 195 U.S.P.Q. 439 (C.C.P.A.1977).

[n.57]. Id. at 1240, 195 U.S.P.Q. at 443.

[n.58]. 241 F.2d 755, 113 U.S.P.Q. 77 (C.C.P.A.1957).

[n.59]. Id. at 759, 113 U.S.P.Q. at 81.

[n.60]. Stephanie Epstein, James Matthew Jones, Intellectual Property At A Crossroads, Global Piracy and International Competitiveness i, 25 (Congressional Economic Leadership Institute, 1990).

[n.61]. Id. at 11.

[n.62]. Id. at 28.

[n.63]. Id. at 36, 37.

[n.64]. Id. at 57, 58 (emphasis added).

[n.65]. Can the U.S. Stay Ahead in Software, Business Week, Mar. 11, 1991, at 98-105.

[n.66]. 343 F.2d 965, 145 U.S.P.Q. 274 (C.C.P.A.1965).

[n.67]. Id. at 979, 145 U.S.P.Q. at 286.