

UIC John Marshall Journal of Information Technology & Privacy Law

Volume 5
Issue 1 *Computer/Law Journal - Summer 1984*

Article 2

Summer 1984

Means-Plus-Function Claims in Computer Related Patent Applications Within the United States, 5 Computer L.J. 25 (1984)

Stephen A. Becker

Follow this and additional works at: <https://repository.law.uic.edu/jitpl>



Part of the [Computer Law Commons](#), [Intellectual Property Law Commons](#), [Internet Law Commons](#), [Privacy Law Commons](#), and the [Science and Technology Law Commons](#)

Recommended Citation

Stephen A. Becker, Means-Plus-Function Claims in Computer Related Patent Applications Within the United States, 5 Computer L.J. 25 (1984)

<https://repository.law.uic.edu/jitpl/vol5/iss1/2>

This Article is brought to you for free and open access by UIC Law Open Access Repository. It has been accepted for inclusion in UIC John Marshall Journal of Information Technology & Privacy Law by an authorized administrator of UIC Law Open Access Repository. For more information, please contact repository@jmls.edu.

MEANS-PLUS-FUNCTION CLAIMS IN COMPUTER RELATED PATENT APPLICATIONS WITHIN THE UNITED STATES

by STEPHEN A. BECKER*

TABLE OF CONTENTS

I. INTRODUCTION	25
II. HISTORICAL BACKGROUND	26
A. FUNCTIONAL CLAIM DRAFTING IN THE UNITED STATES PRIOR TO 1952	27
B. POST-1952 ATTITUDE OF THE PATENT AND TRADEMARK OFFICE TOWARD FUNCTIONAL CLAIM DRAFTING	30
C. EARLY JUDICIAL ATTITUDES TOWARD THE LAST PARAGRAPH OF 35 U.S.C. § 112	32
D. SINGLE MEANS CLAIMS	33
III. ISSUES CONCERNING COMPUTER RELATED INVENTIONS	34
A. DISCLOSURE REQUIREMENTS	35
B. MEANS-PLUS-FUNCTION CLAIM LANGUAGE AND MENTAL STEPS	38
C. MEANS-PLUS-FUNCTION CLAIMS AND APPARATUS- METHOD CLAIM DUALITY	40
D. MEANS-PLUS-FUNCTION CLAIMS AND METHODS OF DOING BUSINESS	43
E. MEANS-PLUS-FUNCTION CLAIMS AND THE APPLICABLE PRIOR ART	44
F. MEANS-PLUS-FUNCTION CLAIMS AND INFRINGEMENT	47
IV. CONCLUSION	48

I. INTRODUCTION

Practitioners in the United States have for some time drafted

* Partner, Lowe, King, Price & Becker, Arlington, Virginia; J.D., George Washington University.

patent claims in means-plus-function format, particularly in claims involving electronics more appropriately characterized by function than by structure.¹ However, means-plus-function claim drafting has encountered obstacles caused by the same characteristic that makes those claims valuable: breadth. This Article explores the history of functional claim drafting in the United States and covers issues of particular significance to means-plus-function claim drafting in computer related patent applications. The attitude of the Patent and Trademark Office toward means-plus-function claim drafting and relevant court decisions are also discussed.

II. HISTORICAL BACKGROUND

To provide an incentive to invent, the patent system in the United States awards to patentees the right to exclude others from manufacture, use, or sale of the patented invention within the U.S., its territories and possessions for a period of seventeen years.² This grant is explicitly authorized by the Constitution.³ To receive the grant, the inventor must make a disclosure that is full enough to enable any person skilled in the art to which the invention pertains, or is most nearly connected, to make and use the invention.⁴ This ensures that, following expiration of the patent, the public will be in full possession of the invention.

To clearly apprise the public of the technology covered by the patent and the technology still available, the claims must clearly define the claimed invention. This is necessary so that others will be free to solve the same problem during the life of the patent using non-equivalent means. Patents must encourage research, not stifle it. Yet, the inventor must be suitably rewarded for his expenditure of time, capital, and innovation; the public should not be permitted to avoid the patent simply by making some modifications and producing what is essentially the same invention.

This creates a dilemma. Since the boundary defined by a claim cannot be drafted with absolute precision, the patent draftsman must define the invention specifically enough to enable competitors to know when the claims are infringed.⁵ Conversely, the draftsman must not draft the claims so narrowly that they cover only the specific embodiment shown in the specification. Narrow claim drafting

1. Claims may be written whereby an element thereof "may be expressed as a means or step for performing a specified function . . ." 35 U.S.C. § 112 (1982).

2. 35 U.S.C. § 154 (1982).

3. U.S. CONST. art. I, § 8.

4. 35 U.S.C. § 112 (1982).

5. *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228 (1942).

would result in a patent of little practical value, since it is almost always possible to change the elements in the disclosure while still taking full advantage of the invention.⁶ This is particularly true in cases involving programmed computers; the same or an equivalent result can be obtained using countless different programs beyond the ones disclosed in the specification.

Before one can fully appreciate the problems as well as the benefits that beset means-plus-function claim language in computer related patent applications, one must first understand how the law of such claim language has evolved in the United States in mechanical and early electrical cases.

A. FUNCTIONAL CLAIM DRAFTING IN THE UNITED STATES PRIOR TO 1952

Early Patent and Trademark Office decisions expressed hostility toward "means" language in claims on the basis that the claims would be too broad or would possibly cover subject matter not allowed by the patent laws.⁷ Litigation involving the telegraph established the early principle that a patent is limited to the elements that produce the result claimed.⁸ The Supreme Court found the following claim invalid because it was of such broad scope that the patent would tend to discourage others from seeking alternative solutions to the application of electromagnetism in long-range telegraphy.

[T]he essence of my invention being the use of the mode of power of the electric or galvanic current, which I call electro-magnetism, however developed, for making or printing intelligible characters, letters or signs, at any distances, being a new application of that power, which I claim to be the first inventor or discoverer.⁹

However, in the *Telephone Cases*,¹⁰ two methods of producing electrical signals corresponding to voice were disclosed in the specification. The first method, thoroughly described in the specification, used magnetic induction; the second method, only briefly described, used resistance variation. The claim at issue was "[t]he method of, and apparatus for, transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or

6. See *Royal Typewriter Co. v. Remington Rand, Inc.*, 168 F.2d 691, 693-94 (2d Cir. 1948).

7. See *Ex Parte Paige*, 1887 Dec. Comm'r Pat. 71, 79-80.

8. *O'Reilly v. Morse*, 56 U.S. (15 How.) 402 (1853).

9. *Id.* at 418.

10. 126 U.S. 1 (1887).

other sounds, substantially as set forth."¹¹

The Supreme Court held the claim valid, despite the "functional" language, because the claim did not cover all methods or apparatus for telegraphic transmission of sounds. Only those methods that involved production of "electrical undulations" were covered.¹²

As later expressed by the Court of Customs and Patent Appeals (C.C.P.A., now the Court of Appeals for the Federal Circuit (C.A.F.C.)): "[O]ne may not claim all means of doing a thing by broad means limitation and thereby throttle and prevent future inventive efforts in the line of improving such means of doing the particular thing."¹³ The statute under which these early cases were decided required the inventor to "particularly point out and distinctly claim the part, improvement, or combination which he [claimed] as his invention or discovery."¹⁴

The extremes in judicial interpretation of this statute are illustrated by *Continental Paper Bag Co. v. Eastern Paper Bag Co.*¹⁵ and *Halliburton Oil Well Cementing Co. v. Walker.*¹⁶ The *Continental Paper Bag* case dealt with a patent for a paper bag machine having a rotating cylinder and a forming plate, both provided with side forming fingers adapted to move toward or away from each other during formation of a bag tube. The cylinder and forming plate of a paper machine apparently had never before been combined, and maintaining engagement between the plate and cylinder through a substantial arc was a problem. The claim was:

In a paper bag machine, the combination of a rotating cylinder provided with one or more pairs of side-folding fingers adapted to be moved toward or from each other, a forming plate also provided with side-forming fingers adapted to be moved toward or from each other, means for operating said fingers at definite times during the formative action upon the bag tube, operating means for the forming plate adapted to cause the said plate to oscillate about its rear edge upon the surface of the cylinder . . . , the whole operating for the purpose of opening and forming the bottom of the bag tube, and means to move the bag tube with the cylinder.¹⁷

The Court construed the claim to define not function, but rather

11. *Id.* at 13.

12. *Id.* at 537-38.

13. *In re Smellie*, 111 F.2d 651, 652 (C.C.P.A. 1940). See also *Philip A. Hunt Co. v. Mallinkrodt Chemical Works*, 177 F.2d 583 (2d Cir. 1949); *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228 (1942).

14. *Smith, Functional Claims and the Patent Act of 1952*, 48 J. PAT. OFF. SOC'Y 426, 428 (1966) (citing Revised Statutes § 4888 (1873)).

15. 210 U.S. 405 (1908).

16. 329 U.S. 1 (1946).

17. *Continental Paper Bag*, 210 U.S. at 417.

a mechanical means for bringing specific parts of the apparatus into working relation. In other words, the "operating means" functionally described an element of the machine, rather than the purpose of the machine or combination as a whole. This case was widely followed as a liberal interpretation of the early patent statute.

Halliburton, on the other hand, was the leading case for a strict interpretation of the statute. The invention was an apparatus designed for use in deep oil wells to measure the distance from the well top to the fluid surface for determining pump placement. Due to the configuration of some oil wells, direct measurement was impossible. The prior art used a sound-echo-time measurement method wherein a pressure change was developed through a short blast of gas, the returned echo was observed and measured, and the oil well depth was determined. Unfortunately, sound does not travel uniformly down all oil wells. The Walker patent, recognizing that an oil flow pipe of a well consists of lengths of tubing that are jointed with collars, detected the collars ultrasonically, counted the number of pipe sections between the collars, and multiplied the count by the length of each section. A typical claim in the Walker patent was:

In an apparatus for determining the location of an obstruction in a well having therein a string of assembled tubing sections interconnected with each other by coupling collars, means communicating with said well for creating a pressure impulse in said well, echo receiving means including a pressure responsive device exposed to said well for receiving pressure impulses from the well and for measuring the lapse of time between the creation of the impulse and the arrival at said receiving means of the echo from said obstruction, and means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other.¹⁸

The claim was held invalid because the point of novelty was described in terms of function rather than of structure. The specification disclosed a resonator as the crucial element in the combination, but gave no indication that the patentee contemplated any specific structural alternative for the resonator. The issue was one of undue breadth: "Yet if Walker's [patent] claims be valid, no device to clarify echo waves, now known or hereafter invented, whether the device be an actual equivalent of Walker's ingredient or not, could be used in a combination such as this, during the life of Walker's patent."¹⁹

The court distinguished this case from the *Continental Paper*

18. *Halliburton*, 329 U.S. at 9 n.7.

19. *Id.* at 12.

Bag case on the ground that the *Continental Paper Bag* claims structurally described the physical and operating relationships of all of the crucial parts of the novel combination. In *Halliburton*, however, the patent claims were simply too broad and did not adequately describe the alleged invention. The *Halliburton* case thus cast considerable doubt on the propriety of means clauses, particularly at the point of novelty.²⁰

Numerous other cases decided during this era further clouded the issue. In *Faulkner v. Gibbs*,²¹ for example, the Supreme Court held valid a claim that recited over the prior art at two points of novelty through the use of means clauses, on the basis that the claim recited a "true combination." Although *Faulkner* did not overrule *Halliburton*, it breathed new life into the usage of means clauses generally; in other words, the use of the word "means" in a claim was no longer considered to be a sufficient reason to invalidate or refuse the claim. Nevertheless, the law regarding the propriety of means-plus-function claim language remained unsettled. This led, in 1952, to the addition of the following language to the patent statutes:

An element in a claim for a combination may be expressed as a means or step for performing a specified function, without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material or acts described in the specification and equivalents thereof.²²

This change modified the rule of *Halliburton* with respect to functional claim drafting.²³

B. POST-1952 ATTITUDE OF THE PATENT AND TRADEMARK OFFICE TOWARD FUNCTIONAL CLAIM DRAFTING

The policy of the Patent and Trademark Office (PTO) is to accept means-plus-function claim language in combination claims so long as the claims particularly point out and distinctly claim the subject matter that the applicant regards as his invention.²⁴ Although an element of a combination claim drafted in means-plus-function language is vulnerable to anticipation by a greater body of prior art than is an element drafted in terms of structure only, means-plus-function claim limitations are often difficult to search.

20. See Blaustein, *Functional Claims Under the Patent Act of 1952*, 26 GEO. WASH. L. REV. 613, 616 (1958).

21. 338 U.S. 267 (1949).

22. 35 U.S.C. § 112 (1982) (enacted by the Patent Act of 1952, Pub. L. No. 593, 66 Stat. 792 (1952)).

23. See *In re Atwood*, 354 F.2d 365, 374 (C.C.P.A. 1966).

24. 35 U.S.C. § 112 (1982).

Thus, as a practical matter, some examiners, particularly those who handle mechanical cases and who date from the pre-1952 era, are reluctant to grant such claims. Nevertheless, the Board of Appeals of the PTO has specifically upheld claims having means-plus-function limitations, even at the point of novelty of the invention.

In *Ex parte Ball*,²⁵ for example, the Board of Appeals held patentable a claim having means clauses that recited an operation different from that disclosed in a prior art patent. In reaching its conclusion, the Board made an analysis of the specification to ensure that the structure for practicing the claimed means was adequately disclosed. Thus, the use of "means" language in a claim, as permitted by the last paragraph of section 112 of the United States Code, Title 35, does not relieve the applicant of his duty to provide a full disclosure of the invention, as required by the second paragraph of section 112. In another case, the Board of Appeals held that a means-plus-function clause in a claim is acceptable under the last paragraph of section 112, even at the exact point of novelty in a combination, if the claim is definite.²⁶

The Board of Appeals has continued to grapple with interpretations of means-plus-function claim language, recognizing that functional claim language, even when supported by structure in the disclosure, will not be allowed where the claim reads on the prior art.²⁷

The present position of the PTO regarding means-plus-function claim language is set forth in section 706.03(c) of the Manual of Patent Examining Procedure (MPEP).²⁸ The examiners are directed to avoid rejecting a combination claim on the ground that the claim distinguishes from the prior art solely on the basis of a means-plus-function limitation. The examiners are cautioned, however, to ensure that the claim particularly points out and distinctly claims the

25. 1953 Dec. Comm'r Pat. 4.

26. *Ex parte Mayer*, 111 U.S.P.Q. (BNA) 109, 110 (1956).

27. *See, e.g., Ex parte Anderson*, 101 U.S.P.Q. (BNA) 128 (1953).

28. [The last paragraph] of 35 U.S.C. 112 [sic] has the effect of prohibiting the rejection of a claim for a combination of elements (or steps) on the ground that the claim distinguishes from the prior art solely in an element (or step) defined as a "means" (or "step") coupled with a statement of function. However this provision of [the last paragraph] must always be considered as subordinate to the provision of paragraph 2 that the claim particularly point out and distinctly claim subject matter. If a claim [is] found to contain language approved by [the last paragraph,] such claim should always be tested additionally for compliance with paragraph 2 and if it fails to comply with the requirements of paragraph 2, the claim should be rejected and the reasons fully stated.

PATENT AND TRADEMARK OFFICE, U.S. DEPARTMENT OF COMMERCE, MANUAL OF PATENT EXAMINING PROCEDURE § 706.03(c) (1976).

subject matter considered by the applicant to be his invention.²⁹

C. EARLY JUDICIAL ATTITUDES TOWARD THE
LAST PARAGRAPH OF 35 U.S.C. § 112

In one of the first Court of Customs and Patent Appeals (C.C.P.A.) cases³⁰ to consider the last paragraph of section 112, the court found functional statements in the claims relating to the dimensions of tubes or conduits containing currents of molten glass to be purely functional. At issue was language claiming "the cross section of said [conduit] being sufficiently small to ensure to the glass stream, flowing through said [section] as a result of the extraction of glass from the furnace, a speed sufficiently high to prevent any back current through said [conduit]."³¹ The specification provided no more detail to the required dimensions than the claims, a deficiency deemed fatal.³²

The issue of the scope of prior art that may be read upon by functional claim language was discussed by the C.C.P.A. in *In re Lundberg*,³³ wherein the application contained a means-plus-function claim and the specification described one embodiment distinct from the prior art. The court held that, if the applicant's means clause in a claim reads upon the prior art, the claim is anticipated even if the specification describes a means that is not shown in the prior art. The court emphasized that the disclosure requirement of paragraph one of section 112 and the requirement of paragraph two that the claims particularly point out and distinctly claim the invention are not diminished by the addition of the "means" language in the last paragraph of that section. The court stated that the last paragraph must be read in light of the first two, and must be given an interpretation consistent with the clear meaning of those paragraphs.³⁴

In *Siegel v. Watson*, a district court disallowed language claiming a "means responsive to the vibrations of said diamond for [controlling] the position of the cutting disk on its [planetary] axis" as being a statement of result rather than of function.³⁵ In a similar decision, a claim was held invalid because a critical element was not mentioned either structurally or as a means or step for performing a

29. *Id.*

30. *In re Arbeit*, 206 F.2d 947 (C.C.P.A. 1953).

31. *Id.* at 953.

32. *See also* *Sola Elec. Co. v. General Elec. Co.*, 146 F. Supp. 625 (N.D. Ill. 1956).

33. 244 F.2d 543 (C.C.P.A. 1957).

34. *Id.* *See also* *In re Henatsch*, 298 F.2d 954 (C.C.P.A. 1962).

35. *Siegel v. Watson*, 156 F. Supp. 820, 822 (D.D.C. 1957).

specified function in that claim.³⁶ The court noted that section 112 specifically permits the patentee to omit specific structural details shown in the specification from his claims, but only when an element in the claim is expressed as a means for performing a specified function.³⁷

Some of the early appellate court cases displayed reluctance to accept the provisions of the last paragraph of section 112. One case, decided in the Fifth Circuit in 1958, went against legislative history and held that the word "means" or its equivalent synonyms "cannot be used to describe the invention at the very point of novelty for to do so would then be to define invention in terms of the result."³⁸ In *S.D. Warren Co. v. Nashua Gunned & Coated Paper Co.*,³⁹ the requirement of the earlier law, that a statement of functional result at the precise point of novelty renders the claim unpatentable, was stated without any consideration of the statutory changes regarding functional claim drafting. *Stearns v. Tinker & Rasor*⁴⁰ held that a means clause recited to cover an element is anticipated by any structure that performs the same function not just equivalent structures. Relying on *Stearns*, the court in *Del Francia v. Stanthony Corp.*⁴¹ stated that "[w]hile the claims must be read in the light of the disclosure of the specifications, this does not restrict the invention to the precise structure disclosed, but rather to the real invention as found in the specifications and drawings."⁴² As a result, the court narrowly construed the "means" language in the claims and affirmed a finding that the claims had not been infringed.

D. SINGLE MEANS CLAIMS

The last paragraph of section 112 states that "an element in a claim for a *combination* may be expressed as a means"⁴³ It has been argued, however, that the second paragraph of section 112 was meant by Congress to sanction any form of claiming that particularly points out what an applicant regards as his invention, and that there is no prohibition of single means claims in the final paragraph.⁴⁴

The problem with a single means claim is that it covers every

36. *Winslow Mfg. Co. v. Peerless Gauge Co.*, 202 F. Supp. 931 (N.D. Ohio 1958).

37. *Id.* at 935.

38. *Bryan v. Sid W. Richardson, Inc.*, 254 F.2d 191, 194 (5th Cir. 1958).

39. 205 F.2d 602 (1st Cir. 1953).

40. 252 F.2d 589 (9th Cir. 1957).

41. 278 F.2d 745 (9th Cir. 1960).

42. *Id.* at 747.

43. 35 U.S.C. § 112 (1982) (emphasis added).

44. *In re Hyatt*, 708 F.2d 712 (C.A.F.C. 1983).

conceivable means for achieving the stated result, while the specification discloses at most only those means known to the inventor. In other words, a single means claim tends to be too broad.⁴⁵

It is unclear whether a single means claim is more properly rejected under the first paragraph of section 112 on the basis that the "enabling" disclosure is not commensurate in scope with the claimed subject matter,⁴⁶ or under the second paragraph of that section on the basis that the claim fails to clearly point out the invention. The C.A.F.C. has elected to avoid the issue as academic and will reject single means claims based broadly on section 112.⁴⁷ The final paragraph of section 112, however, saves *combination* claims drafted using a means-plus-function format from this problem by providing a construction of that format narrow enough to avoid the undue breadth problem.

The language (of the final paragraph of Section 112) does not go so far as to permit a so-called single means claim, that is, a claim which recites merely one means plus a statement of function and nothing else. Attempts to evade this by adding purely nominal elements to such a claim will undoubtedly be condemned.⁴⁸

III. ISSUES CONCERNING COMPUTER RELATED INVENTIONS

Issues that arise under the last paragraph of 35 U.S.C. § 112 in connection with computer related inventions are basically the same issues that occur in connection with other types of inventions. Particular problems that arise in connection with computer related inventions are a result more of the nature of computers themselves than of section 112.

For example, a number of cases in the United States have dealt with the adequacy of disclosure to support claims in computer related cases that are drafted in means-plus-function language. One problem involving disclosure is that it is not possible to point out particular electronic components interconnected to perform a specific function in a disclosure that merely identifies a general purpose digital computer and describes a program flow chart. How much disclosure is required to support computer related means-plus-function claims that themselves do not recite any specific structure?

45. See, e.g., *O'Reilly v. Morse*, 56 U.S. (15 How.) 402, 425-27 (1853); *In re Borkowski*, 422 F.2d 904 (C.C.P.A. 1970).

46. *O'Reilly v. Morse*, 56 U.S. (15 How.) 402, 425-27 (1853).

47. *In re Hyatt*, 708 F.2d 712, 714 (C.A.F.C. 1983).

48. Federico, *Commentary on the New Patent Act*, 35 U.S.C.A. §§ 1-110 (West 1954), at 26.

In computer related cases, means-plus-function claims may be considered either statutory or nonstatutory, depending upon their scope. Should a means-plus-function claim that covers any apparatus for effecting a result be treated differently than a method claim in making this determination? If the scope of the claims is interpreted broadly enough to read on a mental process or on an individual using pencil and paper to perform a calculation, is the claim statutory or nonstatutory?

There are also particular problems involving equivalents in computer related cases. For example, is a means-plus-function claim that is supported by a programmed computer specification broad enough, for infringement purposes, to read upon a hard-wired or mechanical "equivalent"? On the other hand, what is the scope of prior art that is applicable to such claims? Do hard-wired or mechanical systems that perform the same function as the means-plus-function claims constitute prior art? This section addresses some of these questions.

A. DISCLOSURE REQUIREMENTS

A claim on a combination written in means-plus-function language is to be construed to "cover the corresponding structure, material, or acts described in the specification and equivalents thereof."⁴⁹ The specification must, however, describe the invention in "the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same."⁵⁰ A problem that commonly occurs in computer related patent applications having means-plus-function claim limitations is finding support for the limitations in a specification that typically describes the programming of a general purpose computer by the use of flow charts. Is a flow chart disclosure of a programmed general purpose computer enough? This issue was addressed by the C.C.P.A. in *In re Knowlton*.⁵¹

The invention in *Knowlton* related to a list processor, which involves a system for computer processing of items of information that are related or have characteristics in common. The specification included schematic block diagrams, related to various aspects of the invention, descriptions of the drawings, in which the relationships among the depicted components of the invention were generally described, a number of computer program listings, and descriptions of

49. 35 U.S.C. § 112 (1982).

50. *Id.*

51. 481 F.2d 1357 (C.C.P.A. 1973).

how the listed programs work with a general purpose digital computer. The claims were all drafted in means-plus-function claim format, most calling for "means for organizing a memory into storage blocks, means for specifying fields in such storage blocks, base registers for holding pointer signals to the blocks, and processing means using the pointer signals for operating on the contents of the specified fields."⁵²

A rejection due to inadequacy of disclosure applied by the patent examiner was based upon the position that each instruction in the program did not uniquely and unambiguously define an apparatus configuration. The thrust of the argument was that, in order to provide adequate disclosure in a computer implemented system, the separate microstructure of the computer during each program step would have to be shown. Such a disclosure is of course virtually impossible. The Board of Patent Appeals accepted the disclosure as being adequate insofar as the programs detailed in the specification would be effective to operate a computer to carry out the invention. Nevertheless, the Board held that the claims, which were written in functional language, would preempt every possible hardware configuration that would give the same ultimate result. The Board felt that, since a programmed general purpose computer bears no discernable apparatus relationship to a specially constructed machine, the invention was overclaimed; that is, it preempted more than what was disclosed by the specification.

The C.C.P.A. reversed the examiner and the Board on the basis that the specification did disclose an apparatus in the form of a particular general purpose computer as well as memory, base registers, and other more specific hardware items that performed each of the functions called for by the means-plus-function recitation of the claims.⁵³ Those skilled in the art to which the application was directed would know the types of hardware designated by the terms and would know that the necessary hardware was available. The C.C.P.A. noted that the disclosure was not sketchy, but rather went into considerable detail in explaining the interrelationships among the disclosed hardware elements.⁵⁴ Although the computer microstructure that results when the applicant's program is loaded into the computer was not described, the C.C.P.A. recognized that a balance must be drawn: "[h]owever, it must be borne in mind that the disclosure need not only be full, clear and exact to satisfy the statute, it must also be concise in that the disclosure is related to those

52. *Id.* at 1361.

53. *Id.* at 1367-69.

54. *Id.*

skilled in the art."⁵⁵

In *In re Noll*,⁵⁶ the claims were drawn to an apparatus for scan-converting a sequence of data bits into a sequence of signals for the display of text or other information on a video screen. The specification disclosed a programmable data processor operating in the scan conversion under the control of a program, whereas the prior art used hardware circuitry. The examiner allowed the first claim, which was the only independent claim in the application:

1. A computer graphics system for displaying in a multi-line, multi-point-per-line format images corresponding to a sequence of input display commands comprising
 - (A) a programmable data processor operating under the control of a program to convert said display commands into data entries in an array of multi-bit data words, each entry in said array corresponding to a discrete point in the image to be displayed,
 - (B) a scanned-raster display device for generating illuminated points on a display surface in response to applied data signals and
 - (C) means intermediate said data processor and said display device and cooperating with said data processor for sequentially accessing said words in said array for presentation to said display device.⁵⁷

The second claim is exemplary of the dependent claims that were rejected by the examiner as being based upon an inadequate disclosure and inferentially as failing to properly define the invention:

2. Apparatus according to claim 1, wherein said program controlled data processor comprises
 - (1) a memory storing data signal including program control signals and said array of data words, and,
 - (2) process means responsive to said program control signals stored in said memory for
 - (a) interpreting input display commands,
 - (b) converting said input display commands into location signals for controlling the storage of corresponding digital signals in said array, and
 - (c) selectively reading data from said array, said means for selectively reading also being responsive to signals from said intermediate means.⁵⁸

The examiner distinguished claim 1, which was considered

55. *Id.* at 1367.

56. 545 F.2d 141 (C.C.P.A. 1976), *cert. denied*, 434 U.S. 875 (1977).

57. *Id.* at 144.

58. *Id.*

properly supportable in the specification, from claim 2, which was not, on the basis that claim 1 was adequately supported by a programmable data processor and sufficient flow charts as well as citation of a specific general purpose computer, while claim 2 attempted to extend claim 1 to a specific apparatus contained within the data processor. The examiner required a showing of the particular structure within the computer that was conditioned by the operation of the program.

The C.C.P.A. reversed, pointing out that a programmed computer comprises physical structure, including storage devices and electrical components uniquely configured to perform specified functions through the physical properties of electrical circuits to achieve controlled results.⁵⁹ Furthermore, the invention was limited to computer graphics systems, and did not encompass other types of machines for achieving the results.

In a similar case, *In re Comstock*,⁶⁰ the application related to an electronic calculator having as its principal feature a means for retrieving numerical data placed in storage on a first-in, first-out basis. The claims were apparatus claims drafted in means-plus-function language. The court ruled that the specification sufficiently disclosed the structure to support means-plus-function claim language on the basis of a general reference in the specification to the structure of an IBM 1620 computer, together with flow charts describing the necessary programming.⁶¹

Thus, it appears to be well settled that a disclosure of a general purpose digital computer, together with a disclosure of programming for operating the computer to perform the function set forth in the means-plus-function claims, is sufficient. Care must be taken, however, to ensure that the disclosure of the programming is adequate to enable one of ordinary skill in the art to practice the invention.

B. MEANS-PLUS-FUNCTION CLAIM LANGUAGE AND MENTAL STEPS

Functional limitations in claims are broader than structural limitations. In the context of a computer related invention, means-plus-function language can sometimes be construed broadly enough to cover a human being as one or more of the means, using pencil, paper, ruler, and the like. In *In re Prater*,⁶² the invention was a method and apparatus for processing conventionally obtained data

59. *Id.* at 148.

60. 481 F.2d 905 (C.C.P.A. 1973).

61. *Id.* at 909-10.

62. 415 F.2d 1378 (C.C.P.A. 1968).

to produce a spectrographic analysis of a known mixture, and to determine unknown component concentrations with minimum error. A number of method claims as well as a single apparatus claim were at issue. The method claims were rejected by the examiner as being unpatentable mental processes. The apparatus claim was rejected as being unpatentable over the prior art as well as for failing to properly define the invention since, although the disclosed invention was practiced on an analog computer, the claim language was considered broad enough to read on a properly programmed general purpose digital computer. The C.C.P.A. held, as to the method claims, that patent protection should not be denied merely because method claims can alternatively be read on a process performed through the human mind by the use of aids such as a pencil and paper.⁶³ The apparatus claim was also found to be patentable because it was the apparatus counterpart of one of the patentable method claims.⁶⁴

Upon rehearing, however, the C.C.P.A. reversed itself as to the method claims on the basis that those claims were too broad, even when read in light of the specification, since the method could be practiced by a human being making pencil and paper markings.⁶⁵ The apparatus claim, however, was held patentable on the basis that the claim was written in typical means-plus-function language as expressly permitted by the third paragraph of section 112. The court held that, as a matter of law, "[t]he pencil, paper and ruler—referred to by the board in regard to 35 U.S.C. § 102—do *not* anticipate the claimed 'means' since the former additionally require human manipulation."⁶⁶

The mental steps issue has been raised in several other cases in the United States. In *In re Bernhart*,⁶⁷ for example, the invention involved a method and apparatus for automatically making a two-dimensional portrayal of a three-dimensional object from any desired angle and distance and on any desired plane of projection. Equations defining the geometric relationship between the two-dimensional and three-dimensional coordinates were used to control the operation of the computer, which in turn controlled the operation of a plotting machine.

The examiner rejected the claims on, among others, the ground that the novelty in the claims (presumably the programming

63. *Id.* at 1389.

64. *Id.*

65. *In re Prater*, 415 F.2d 1393, 1401-05 (C.C.P.A. 1969).

66. *Id.* at 1406.

67. 417 F.2d 1395 (C.C.P.A. 1969).

means) did not constitute a structural difference over the prior art, and was therefore predicated for patentability on mental steps. The C.C.P.A. reversed the rejection on the ground that the apparatus claims contained no recitation of mental steps or of any element requiring or even permitting the incorporation of human facilities on the apparatus.

These claims recite, and can be infringed only by, a digital computer in a certain physical condition, i.e., electromechanically set or programmed to carry out the recited routine. The claims also define the invention as having plotting means for drawing lines or for illustrating an object. When such functional language is used in a claim, 35 U.S.C. § 112 states that "such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." The specification here mentions only mechanical drafting machines. The claims therefore cover, under section 112, only such mechanical drafting machines and their equivalents. We know of no authority for holding that a human being, such as a draftsman, could ever be the equivalent of a machine disclosed in a patent application, and we are not prepared to so hold in this case. Accordingly, we think it clear that applicants have not defined as their invention anything in which the human mind could be used as a component.⁶⁸

Thus, the mental steps doctrine does not apply where the claimed invention is clearly an apparatus, even if the claims contain means-plus-function limitations. But the claims will presumably not escape a mental steps rejection if the means-plus-function limitations are so broad that the claim as a whole actually defines a process because it covers every conceivable apparatus for effecting that process. Overlap between means-plus-function claim language and process (method) claim language is referred to herein as "apparatus-method claim duality."

C. MEANS-PLUS-FUNCTION CLAIMS AND APPARATUS-METHOD CLAIM DUALITY

In *In re Meyer*,⁶⁹ the invention was directed toward an apparatus and method involving a programmed computer to test a complex system for possible malfunctions. The invention was designed for application in diagnosing the nervous system of a human being and, in particular, neural pathways. The method claims were held to be nonstatutory since they recited a mathematical algorithm, representing a mental process that a neurologist should follow.⁷⁰ The ap-

68. *Id.* at 1399.

69. 688 F.2d 789 (C.C.P.A. 1982).

70. *Id.* at 795.

paratus claims, drafted in means-plus-function language, differed from the method claims by reciting "means for performing" the steps set forth in the method claims, and "means for displaying" the results. The court held that "such claims are treated as indistinguishable from the method claims for the purposes of section 101 unless it is demonstrated that the claims are drawn to specific apparatus distinct from other apparatus capable of performing the identical function."⁷¹

Similarly, in *In re Abele*,⁷² the C.C.P.A. refused to distinguish apparatus claims drafted in broad means-plus-function language from corresponding unpatentable process claims in an invention using a computer-based system to improve image processing and axial tomography. The court rejected an apparatus claim as being a counterpart to a process claim that was considered to be directed solely to a mathematical algorithm portion of the applicant's invention.

In *In re Walter*,⁷³ both the patent examiner and the Board of Appeals refused to consider the appellant's method and apparatus claims separately because they were deemed indistinguishable. The C.C.P.A. addressed this issue, stating:

This problem arises in computer-arts inventions when the structure in apparatus claims is defined only as "means for" performing specified functions as sanctioned by 35 U.S.C. § 112, sixth paragraph. If the functionally-defined disclosed means and their equivalents are so broad that they encompass any and every means for performing the recited functions, the apparatus claim is an attempt to exalt form over substance since the claim is really to a method or series of functions itself. In computer-related inventions, the recited means also perform the function of "number crunching" (solving mathematical algorithms and making calculations). In such cases the burden must be placed on the applicant to demonstrate that the claims are truly drawn to specific apparatus distinct from other apparatus capable of performing identical functions.

If this burden has not been discharged, the apparatus claim will be treated as if it were drawn to the method or process which encompasses all of the claimed "means". . . . The statutory nature of the claim under § 101 will then depend upon whether the corresponding method is statutory.⁷⁴

Thus, an otherwise unpatentable method cannot be indirectly claimed by drafting a corresponding apparatus claim in means-plus-function language of a scope broad enough to substantially encompass the method. The means-plus-function claim will be examined

71. *Id.* at 795 n.3 (citing *In re Pardo*, 684 F.2d 912, 916 n.6 (C.C.P.A. 1982)).

72. 684 F.2d 902 (C.C.P.A. 1982).

73. 618 F.2d 758 (C.C.P.A. 1980).

74. *Id.* at 768.

to determine whether or not the claim, in substance, is to a method constituted by the series of functions recited in the claim. The corresponding method will then be analyzed to determine whether or not it constitutes statutory subject matter. Therefore, the apparatus claim will survive only if the corresponding method is deemed statutory.

Even if an invention is claimed in terms of means-plus-function apparatus limitations, one may argue that the invention should be treated as a method if language in the specification inferentially shows that the invention is in methodology, rather than in apparatus. In *In re Knowlton*,⁷⁵ for example, the specification stated that "[i]nsofar as the present invention is concerned, the essence of applicant's contribution lies in the cooperative effect of the functional means, and not in any specific implementation of these functions."⁷⁶ The inference that a programmed computer is effectively the practicing of a method rather than an apparatus is buttressed by the fact that program steps are performed sequentially, and there is no reliance on any particular apparatus at any single point in time to perform the function. The C.C.P.A. rejected this theory on the basis that language in the specification suggesting that the invention is a process only constitutes evidence that the claims were directed to something other than what the applicant regards as his invention. That evidence, however, was in this case refuted by the rest of the application including the claims as filed, as well as by the appellant's position throughout the pendency of the application, all indicating the invention to be an apparatus for processing list information.⁷⁷

Finally, the invention in *In re Johnston*⁷⁸ was directed toward an automatic financial record keeping system employing a digital computer. Portions of the claimed apparatus were defined as being a means for identifying an account or type of transaction. The Board of Appeals affirmed the rejection of the apparatus claims on the basis that a means for identifying an account or type of transaction, even though represented by a section of computer memory, is in the mind of the user and cannot define any characteristic of an apparatus. The rejection was reversed by the C.C.P.A., with the following commentary:

[W]e find the appealed *apparatus* claims clearly read only upon the subject matter which appellant regards as his invention—a "rec-

75. 481 F.2d 1357 (C.C.P.A. 1973).

76. *Id.* at 1363 (quoting the applicant's specification).

77. *Id.* at 1368-69.

78. 502 F.2d 765 (C.C.P.A. 1974), *rev'd on other grounds sub nom.* *Dann v. Johnston*, 425 U.S. 219 (1976) (invention held unpatentable on grounds of obviousness).

ord-keeping *machine* system for financial accounts" . . .—not a human being inside or outside appellant's apparatus. Appellant's specification makes it quite clear that the claimed apparatus automatically performs the identifying operations referred to by the board; those operations are neither actually performed by a human being, nor can we imagine how they could be realistically performed by a human being.⁷⁹

D. MEANS-PLUS-FUNCTION CLAIMS AND METHODS OF DOING BUSINESS

In some cases, the question arises whether or not a computer-based system, operating in a business environment and defined in terms of means-plus-function claims, is arguably a method of doing business and therefore unpatentable as not constituting statutory subject matter. In *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*,⁸⁰ the invention was directed toward a computer-based system for controlling a cash management account that provided a brokerage security account, a number of money market funds, and a charge/checking account. Although all three types of accounts were previously available to the public, the combination of the three types of accounts by computer provided synergistic benefits in the way that funds were transferred among the accounts so as not to lie idle. The claims included means-plus-function language defining how data are moved among accounts. The validity of the patent was challenged on the basis that the claims were unpatentable because they defined nothing more than the combination of familiar business systems. The claims were alleged to be an attempt to obscure the fact that the invention was merely a business system, with the claims drafted to recite a combination of various means for performing certain functions. The claims were further alleged to fit squarely into the business system category, having nothing to do with an apparatus since the invention could be practiced by hand with the aid of paper, pencil, and telephone.

In the action for declaratory judgment of noninfringement and invalidity, the court found the patent valid under 35 U.S.C. § 101 on the ground that, although patentability of inventions that are essentially mathematical algorithms is proscribed by section 101, no mathematical algorithm was involved. Without considering whether or not the functions defined by the claims could have been practiced by a human being without the aid of a machine, the court noted that

79. 502 F.2d at 770.

80. 564 F. Supp. 1358 (D. Del. 1983).

the claims did not involve a procedure for solving a mathematical problem, but rather were directed toward a methodology to effectuate a highly efficient business system.⁸¹ In determining whether there was statutory subject matter, the court did not consider the product of the claimed invention, but focused instead on the methodology for achieving the product, believing this to be the proper focus of analysis.⁸²

Regarding the challenge to the patent on the ground that the claims defined nothing more than familiar business systems, the court noted that the product of the claims was unpatentable if done by hand. However, the claims taught a method of operating a computer. The court ignored the argument that the focus of the claims was indeed on the service provided by the invention rather than on the method by which the services were provided.⁸³

The case may express an interpretation of section 101 that is too liberal, but if followed it suggests that any type of computer-based system is statutory. It would thus be possible to convert subject matter traditionally held to be unpatentable, such as rules of playing a game or methods of doing business, into statutory subject matter merely by practicing the subject matter with a computer.

E. MEANS-PLUS-FUNCTION CLAIMS AND THE APPLICABLE PRIOR ART

During examination of a patent application, the patent examiner is charged with the responsibility of applying against the claims any subject matter in the prior art literally covered by the claims, construing the claims as broadly as is reasonable.⁸⁴ In computer-related cases, where the operation of a programmed general purpose digital computer is claimed using means-plus-function claim language or method claims of equivalent scope, a question arises as to the scope of the applicable prior art. Simply put, is it appropriate to apply non-computer-related prior art, such as hard-wired circuitry or mechanical elements, against functional claims supported in the specification by a computer implementation?

The answer is that systems of any type, hard-wired, electromechanical, mechanical, or computer-based will be applied as prior art against means-plus-function claims if the system literally reads on the claim. This is true even if the embodiment shown in the specification is a programmed computer. If the applicant desires

81. *Id.* at 1368.

82. *Id.* at 1368-69.

83. *Id.* at 1366-68.

84. MANUAL OF PATENT EXAMINING PROCEDURE § 706 (3rd ed. revised 1978) (MPEP).

the scope of the claims to be limited to a programmed system, then the claims should be written as such. Thus, a claim limitation expressed in means-plus-function language will be anticipated by any means in the prior art capable of performing the indicated function.⁸⁵

For example, the claim limitation "means for moving a component between points A and B along a trajectory defined by the equation . . ." reads upon prior art defined by a mechanical cam having a profile that satisfies the equation and is arranged to control the movement of a member between two points. Conversely, the claim limitation "computer means for . . ." or "programming means for . . ." would presumably not be met by the cam, since this claim is specifically limited to a computer based environment.⁸⁶

In *Digitronics Corp. v. New York Racing Association, Inc.*,⁸⁷ the patent was directed toward a digital computer-based, parimutuel betting system to be used at a racetrack. The computer was programmed to issue betting tickets through dispensing machines, gather betting data, and provide bookkeeping for each race. The total bet on each horse in each race was periodically displayed on a tote board as well as at a central monitoring station. Although electromechanical totalizators had been used for some time in the prior art, and the use of electronics in a totalizator system was at least ten years old before the application was filed, *Digitronics* was apparently the first to successfully develop a digital computer-based parimutuel betting system. The system, besides performing all of the functions previously performed by totalizator systems, also provided system checks to improve data accuracy and to reject unacceptable

85. *Id.* § 706.03(c).

86. The following claim appeared in the first reported decision on software patentability in the United Kingdom:

Linear programming means for use in controlling data processing apparatus so that it effects iterative processing on a set of data representations, which means are formed in such manner as to cause the initiation of an iteration while a previously-initiated iteration is still proceeding, so that a plurality of iterations will proceed concurrently at one or more stages of the processing.

Beresford, *The Protection of Inventions in Computer Programmes in the United Kingdom*, ANNUAL OF INDUSTRIAL PROPERTY LAW 384, 387 (1975) (quoting *Slee & Harris's application*, 1966 Pat. Cas. 194).

This claim was held patentable on the ground that the means could be likened to a cam shaped according to a certain formula so that, when fixed into a machine, it controlled the latter in a certain way. Even so, if this claim were examined in the United States, it would probably not be considered patentable, both because the claim is a single means type claim, proscribed by U.S. law, and because the claim defines more a desired result than a structure to effect a desired result.

87. 187 U.S.P.Q. (BNA) 602 (E.D.N.Y. 1975), *aff'd*, 553 F.2d 740 (2d Cir. 1977).

wagers such as an attempted wager on a scratched entry. Claim 1 was as follows:

1. A data processor for processing transaction signals comprising:

(A) a plurality of pairs of units, each unit of each pair performing the same function as the other unit but with one operating as a master unit and the other as a slave unit,

(B) a master selecting means for selecting which unit of each pair of units is a master and which is a slave and for changing the selection upon receipt of an erroneous-transaction indicating signal only from the selected master unit, and

(C) checking means responsive to transaction signals being processed in each unit of a pair of units for checking for erroneous transaction signals [and] for transmitting an erroneous-transaction indicating signal to said master selecting means so that if the master unit caused said erroneous-transaction signal, said master selecting means then selects the slave unit to be the master unit.⁸⁸

The patent claims were held to be unpatentable over prior art electromechanical parimutuel totalizators (shown in a patent to Handley) even though none employed a programmed digital computer. The primary reference applied against Digitronics was a patent issued in 1944 on an electromechanical totalizator that used relays and solenoids to issue tickets, totalize transactions, report statistics, and monitor wages made on scratched horses.⁸⁹

The court placed no significance on the fact that the prior art patent had nothing to do with electronic data processing:

That Handley is essentially electromechanical and not an electronic digital processing system does not distinguish it. Plaintiff's patent is not on a new, unobviously new means of substituting EDP components in familiar racetrack circuitry. It does not limit its claims to EDP components. The patent claims in issue are systems claims, each consisting in a combination of inclusively indicated means that consist in reality of circuitry connecting conventional elements for conventional uses, the whole enacting an old scenario.

. . . The detailed consideration of Handley demonstrates the overall absence of patentable novelty in the patent in suit. It brings out sharply the extent to which familiar circuits have long handled familiar tasks, and that the plaintiff's patentees brought no new discovery to the task but only a routine choice of familiar but newer means to replace the older ones of Handley in the same union of means. The union embraced in each claim Handley shows to be itself old, the asserted differences between Handley and the plaintiff's patent that plaintiff relies on, emphasizing differences in the

88. 187 U.S.P.Q. (BNA) at 620-21.

89. See 187 U.S.P.Q. (BNA) at 632-37.

means and not in the combinations or unions of means that, broadly, were equivalents, underline the want of novelty in the union of means—the combinations, on the patentable novelty of which validity absolutely depends.⁹⁰

F. MEANS-PLUS-FUNCTION CLAIMS AND INFRINGEMENT

The question of what constitutes infringement of means-plus-function claims is related to the previously addressed question of what constitutes applicable prior art. In either case, the scope of subject matter considered analogous or equivalent to the subject matter claimed in means-plus-function language must be determined. This raises two additional questions. First, will a mechanical or hard-wired system infringe claims written in means-plus-function language where the disclosed embodiment is a computer? Second, if a disclosed embodiment does not involve a computer, will it be infringed by a programmed system that performs the same functions as the claims? There have been no United States cases directly on point.⁹¹ In *Bullard Co. v. General Electric Co.*,⁹² plaintiff's two patents were directed toward machine control. One of the patents performed machine control mechanically whereas the other was electromechanical. The defendant's alleged infringing device operated electronically, using punched tape. The court avoided the question of whether electronic operation is an equivalent of mechanical operation by finding that the alleged infringing device did not contain all of the elements of any claim.⁹³

In *Digitronics*, the claims that were directed toward a data processor for processing transaction signals and that were disclosed in the specification as a programmed computer were held to be unpatentable over prior art.⁹⁴ In dicta, however, the court discussed the question of whether or not the claims would have been infringed by a computer programmed to perform the functions described in the means-plus-function claim language. The court held that such claims are not infringed by a programmed computer on the ground that the various means recited in the claims did not exist simultaneously in a programmed computer. The defendant characterized the issue as follows:

Simply stated, the basic issue posed is whether an apparatus claim for combination of old elements (as distinguished from a process claim) can be infringed where the recited elements exist only in se-

90. 187 U.S.P.Q. (BNA) at 635-37.

91. See *supra* note 86 and accompanying text.

92. 348 F.2d 985 (4th Cir. 1965).

93. *Id.* at 988.

94. See *supra* text accompanying notes 87-90.

quenced transitory states through the interaction of sequentially operative software 'program' instructions with elements of available standardized and multifunctional circuitry and do not coexist as physically identifiable entities at any given instant of time.⁹⁵

Non-infringement was thus based on a finding that a combination claim is not infringed by a machine system that does not include the same combination of means, and that only performs the function to which the patented combination of means is addressed when its general purpose digital computer element is programmed. The court further stated that: "It is not the computer—the machine qua computer—that performs the function, but, rather the machine function of the patent is attained only through the 'use' of the general-purpose computer."⁹⁶ The court considered a programmed system to constitute not a machine means but rather the new use of a known machine, a process. Since means-plus-function language constitutes apparatus, there was no infringement.

The court ignored the plaintiff's better reasoned argument that the physically stored program endows a data processor with the capability of functioning in particular ways. The plaintiff's argument was that the program transformed the general purpose computer into a physical means of performing a function. In this way, the computer temporarily embodied the union of means set forth in the claims. Although the various interconnections of components of a computer are not simultaneously connected when the program is loaded, the general purpose computer, properly programmed, physically harbors in its components the physical means that make it capable of performing the functions defined in the claims.⁹⁷ The dicta in *Digitronics* are based upon a misconception of computers, emphasizing formalistic rather than substantive qualities of the machines, and should not be widely followed.

IV. CONCLUSION

Because computer related inventions are more appropriately characterized by function than by structure, claims language defining such an invention should be as functional as possible. Functional language avoids limiting the scope of the claimed invention to a particular apparatus structure when in practice computer implemented functions can usually be provided by a number of different

95. *Digitronics Corp. v. New York Racing Ass'n, Inc.*, 187 U.S.P.Q. (BNA) 602, 639 (E.D.N.Y. 1975), *aff'd*, 553 F.2d 740 (2d Cir. 1977).

96. *Id.* at 640.

97. *See In re Bernhart*, 417 F.2d 1395, 1400 (C.C.P.A. 1969).

structures. Yet the claim language must adequately distinguish the invention over the prior art.

Functional claims incorporating means-plus-function limitations may be patentable, even if means-plus-function language appears at the point of novelty of the invention. The invention must, however, be definite and commensurate in scope with the invention disclosed in the specification. A claim including means-plus-function language must define all of the necessary elements to cause an invention to carry out a desired result. Otherwise, the claim may be considered to define merely a desired result, rather than sufficient structure to provide that result.

A claim including a means-plus-function limitation must define a combination of elements, that is, more than one means or structural element that cooperate with each other to effect a desired result. If there is only a single means recited in the claim, a "combination" cannot be artificially created by including token additional means or elements to avoid a rejection.

The specification must provide a sufficient disclosure of hardware and software to enable a person skilled in the computer arts to practice the invention without undue experimentation. A detailed flow chart describing programming, together with identification of a general purpose computer, is usually sufficient. It is not necessary to be able to read each element of a claim on the specification, nor is it necessary for all claimed elements to exist simultaneously within a computer.

During examination, any prior art that performs the same functions as those defined in the means-plus-function claim limitations will be applicable as an anticipation. Thus, even if the specification is limited to a programmed general purpose computer, the examiner will probably apply prior art disclosed in a hard-wired or mechanical apparatus that performs the same function as the claimed invention against the claims. In order to render obvious a programmed system claimed as a combination of means-plus-function limitations, a prior art, hard-wired apparatus performing one function may arguably be combinable with a prior art, programmed computer performing a similar function. However, a mechanical element in the prior art for performing one of the functions should not be included in the rejection because it is nonanalogous. Thus, to reduce the scope of applicable prior art, it is preferable to limit claims to a computer-based system environment, unless the invention has applicability outside that environment.

What constitutes infringement of a means-plus-function claim in a computer-type case has not been established. Dicta in one district

court decision have adopted the view that a means-plus-function claim is not infringed by a programmed computer that performs the claimed function because the means-plus-function elements of the claim do not exist in the computer simultaneously.⁹⁸ The better reasoned view adopted by the C.A.F.C. in its decisions involving patentability, however, is that a programmed computer is a storehouse of parts that are successively interconnected in accordance with the program but which nevertheless exist simultaneously.⁹⁹ To be on the safe side, method claims characterizing a computer or software related invention as a new method of operating a general purpose computer, as well as apparatus claims, should be included.

98. *Digitronics Corp. v. New York Racing Ass'n, Inc.*, 187 U.S.P.Q. (BNA) 602, 639 (E.D.N.Y. 1975), *aff'd*, 553 F.2d 740 (2d Cir. 1977).

99. *See In re Prater*, 415 F.2d 1393, 1403 n.29 (C.C.P.A. 1969); *In re Bernhart*, 417 F.2d 1395, 1400 (C.C.P.A. 1969).