

THE CRISIS IN PATENT COVERAGE: DEFINING SCOPE OF AN INVENTION BY FUNCTION

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INTRODUCTION

One of the most important issues in the current debate about the role of intellectual property rights in modern world trade is the question of patent scope. Given that a patent might be obtainable for an invention, how broad should that patent be? How much should it cover, and thereby preclude others from using? The problem has been the subject of general address by commentators;¹ of analysis with respect to particular industries;² and of changes in recent years to the United States patent laws relating to scope of patent rights.³

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1. See, e.g., Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 843 (1990) (excellent review of many of the problems of patent scope, arguing that the effects of broad patent scope depend upon (i) the relationship between successive technical advances in the particular industry, and (ii) the extent to which firms license technologies to each other); Rafael X. Zahraiddin, *The Effect of Broad Patent Scope on the Competitiveness of United States Industry*, 17 DEL. J. CORP. L. 949 (1992) (arguing that unduly broad patents are an impediment to economic progress in some industries, notably semiconductors and software).

2. See, e.g., Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025 (1990) (critiquing lower courts' broad interpretation of *Diamond v. Diehr*, 450 U.S. 175 (1981), which permitted patenting of some computer-implementable processes); see Edward T. Lentz, *Adequacy of Disclosures of Biotechnology Inventions*, 16 AMER. INTELL. PROP. L.A.Q.J. 314, 324 (1988-1989) (commenting on seemingly excessive breadth of biotechnology patents vis-à-vis the technical disclosures in these patents); Gary Slutsker & David C. Churback, *Whose Invention Is It Anyway?* FORBES, Aug. 19, 1991, at 114 (criticizing the patent system with regard to biotechnology inventions).

3. For example, the section of the patent statute that defines acts of patent infringement is 35 U.S.C. § 271. That section was narrowed in 1984 to provide an infringement exemption for making, using, or selling a patented invention "solely for uses reasonably related to the development and submission of information" to the Food and Drug Administration, typically in seeking FDA approval of a drug or medical device. 35 U.S.C. § 271(e), added by Pub. L. No. 98-417, § 202, 98 Stat. 1603. Section 271 was broadened in 1988 to make unlawful, *inter alia*, the importation of an unpatented product made by a process carried out abroad, where the process, if practiced in the United States, would have violated a U.S. process patent. See 35 U.S.C. § 271(g) (1988), added by Pub. L. No. 100-418, § 9003, 102 Stat. 1563-64.

This article will address one controversial aspect of patent scope,⁴ the use of functional language in patent claims. This aspect arises when one defines an invention by what its parts do rather than by the structural names of the parts.⁵ This paper will therefore analyze the development of what may be styled "means-plus-function law" as it applies to several distinct questions of patent interpretation.⁶

The current patent statute, enacted in 1952,⁷ was the first to permit expression of one or more elements of a combination patent claim in terms of "means for" accomplishing a stated function.⁸ Attorneys

4. Beyond the scope of this article are other currently important aspects of patent scope, such as applying the doctrine of equivalents to expand patent coverage. For a discussion of that topic, see, e.g., Martin J. Adelman & Gary L. Francione, *The Doctrine of Equivalents in Patent Law: Questions That Pennwalt Did Not Answer*, 137 U. PA. L. REV. 673 (1989). The main issues affecting the doctrine of equivalents are, at the time of this writing, before the U.S. Court of Appeals for the Federal Circuit for *en banc* review, in *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, Appeal No. 93-1088, 1993 U.S. App. LEXIS 38138. See also *En Banc Federal Circuit Will Review Doctrine of Equivalents and Equity*, 47 Pat. Trademark & Copyright J. (BNA) 133 (1993). Also beyond the scope of this article is the question of whether a patent on a biological material should be allowed to block all uses of that material during the life of the patent. On this subject, see Thomas D. Kiley, *Patents On Random Complementary DNA Fragments? 257 SCIENCE* 915 (1992) (arguing that disclosure of a trivial utility should not allow a patentee to block more important uses discovered later for biologic material); P. Kelly, *Prophetic Patents in Biotechnology*, 8 *BIO/TECH.* 24, 25 (1990) (criticizing use of imaginary, non-laboratory-backed examples in patent specifications on biology subjects). Finally, the present work does not cover whether experimental use is, or should be, generally exempt from the reach of a patent claim for infringement purposes. See, e.g., Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHIC. L. REV. 1017, 1070-74 (1989) (advocating greater employment of the experimental use defense against patent infringement); Irving N. Feit, *Biotechnology Research and the Experimental Use Exception to Patent Infringement*, 71 J. PAT. & TRADEMARK OFF. SOC'Y 819 (1989) (arguing for compulsory licenses to support experimentation by others with patented materials).

5. For earlier works on this particular aspect of patent scope, see 4 Donald S. Chisum, *Patents* (MB) § 18.03[5] (Nov. 1994); R. Carl Moy, *The Interpretation of Means Expressions During Prosecution*, 68 J. PAT. & TRADEMARK OFF. SOC'Y 246 (1986); Maxim H. Waldbaum & David Sipiora, *Pennwalt Redux—Judicial Uncertainty vs. Procrustean Bed*, 19 AMER. INTEL. PROP. L.A.Q.J. 23? (1991); Kenneth R. Adamo, *The Double Standard—In re Bond, The Office*, 35 U.S.C. § 112, para. 6 and *Atlantic Thermoplastics Co.*, 2 FED. CIR. B.J. 137 (1992); Donald S. Chisum, *Patent Law Developments in the United States Court of Appeals for the Federal Circuit During 1991*, 41 AM. U. L. REV. 869, 903-07 (1992). See also this author's address to a conference sponsored by the American Law Institute and American Bar Association on Patent Law Developments, Washington, D.C., December 5-6, 1992, from which the present article in part evolved: Paul M. Janicke, *Means-Plus-Function Claims in Modern Patent Law*, Dec. 4, 1992, available in WESTLAW, ALI-ABA database, C785 ALI-ABA 297.

6. These include (i) defining novelty over the prior art; (ii) defining nonobvious subject matter; (iii) defining eligible subject matter for patenting; and (iv) defining the breadth of patents for infringement purposes.

7. Ch. 950, 66 Stat. 792 (July 19, 1952) (codified as amended at 35 U.S.C. § 1 *et seq.* (1988)).

8. See 35 U.S.C.A. § 112, para. 6 (West Supp. 1992); *infra* note 13. The newness of this

drafting patent applications were quick to adopt that style of claim language. The U.S. Court of Appeals for the Federal Circuit⁹ over the last decade has taken a close look at the implications of using means-plus-function terminology in claims, culminating in two 1994 *en banc*¹⁰ decisions on the subject: *In re Donaldson Co.*¹¹ and *In re Alappat*.¹²

The Patent and Trademark Office ("PTO") for a time refused to follow the court in its decisions on the subject, leading to considerable strain between the court and the PTO. That strain has been largely or fully resolved by *Donaldson* and *Alappat*, and the law now appears finally to have come full circle to where it stood before 1946, when a now-famous Supreme Court decision started the conflict.

I. THE PATENT STATUTE PERMITS FUNCTIONAL DEFINITIONS

The statutory provision for functional patent claim language is in the sixth paragraph of 35 U.S.C. Section 112:

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.¹³

This provision functions mainly through two parts. The first says that one can express an element of a claimed *combination* by reciting the words "means for" followed by the function that element performs in the

provision is described in P.J. Federico, *Commentary On the New Patent Act*, 35 U.S.C.A. 1, 25-26 (West 1954).

9. The Court of Appeals for the Federal Circuit was established under the Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, § 101, 96 Stat. 25 (1982), and has exclusive appellate jurisdiction of all appeals from district courts in patent cases.

10. The enabling statute, 28 U.S.C. § 46(c), refers to a proceeding before all the judges of the court as an "*in banc*" proceeding. However, for consistency, this paper will refer to all such proceedings as being "*en banc*."

11. 16 F.3d 1189 (Fed. Cir. 1994). See discussion *supra* accompanying notes 122-33.

12. 33 F.3d 1526 (Fed. Cir. 1994). See discussion *supra* accompanying notes 84-108.

13. 35 U.S.C.A. § 112, para. 6 (West Supp. 1992). Although the paragraphing has been changed since 1952 (this provision was originally the third paragraph), the text of the provision has not been amended in any way.

claimed combination.¹⁴ Patent claims containing such language are numerous.¹⁵ The conflict has centered around the second part of the provision: "and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."¹⁶ At first it may appear that this provision gives functional recitations a very broad coverage indeed, perhaps reaching any and all structures now known or later developed which can carry out the recited function. Recent case law shows that such a view would be wrong, and that 112(6) actually accords far more restricted coverage. This "cutting back" effect of 112(6) was first expressly observed by the Federal Circuit

14. The statute also says that an element can be recited as a "step" for achieving a function. *Id.* This would appear to apply to language in process claims, i.e., where a combination of process steps constitutes the claimed subject matter. Moreover, the words following "without the recital of . . . acts in support thereof" would lead to the same conclusion. At the time of enactment of the statute there was authority condemning method claims for functionality, i.e., for being too result-oriented. See *Universal Oil Prods. Co. v. Globe Oil & Refining Co.*, 322 U.S. 471, 484 (1944). Present case law is sparse on just what kinds of steps are functional. See *In re Angstadt*, 537 F.2d 498 (C.C.P.A. 1976) (recognizing that functional method claim language is sanctioned by the last paragraph of Section 112); *In re Roberts*, 470 F.2d 1399, 1402-03 (C.C.P.A. 1973) (permitting a method claim to recite the step of "reducing the coefficient of friction of . . . film to below about 0.40 as determined by [a conventional] test"); *In re Cohn*, 438 F.2d 989, 991 (C.C.P.A. 1971) (method step can, pursuant to last paragraph of Section 112, be recited as doing something "until" a particular result occurs, provided the result can in practice be determined with adequate precision by persons skilled in the art). However, no case has been found interpreting this "or step" aspect of paragraph 6 as it appears in the patent statute, and there is no published writing explaining the intent of its drafters. It remains to be seen under what circumstances a process step will be regarded as impacted by the narrowing effect of 112(6). Perhaps it will be those steps which are result-oriented, e.g., heating said solution to deposit metallic iron.

15. In 1993 alone there were 42,082 U.S. patents issued with the expression "means for" in their claims. Search of LEXIS, Patent library, Util file (Oct. 22, 1994).

16. 35 U.S.C.A. § 112, para. 6. Care must be taken to distinguish this statutory provision from the equitable doctrine of equivalents. See *infra* notes 133, 149-63 and accompanying text. Briefly, the equitable doctrine operates to expand patent coverage beyond the language of the claims, where equity requires such expansion to prevent a "fraud on the patent." *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950). To accomplish this, a claim is read as covering not only all the different embodiments of technology expressed in the claim's words (which are typically broad and generic to start with), but also any other embodiments which operate in "substantially the same way and accomplish substantially the same result" as those within the claim. *Id.*

112(6) operates in a similar way, but from a radically different starting point. In most technologies the disclosure by a patent applicant of a single embodiment in her patent specification will support a claim of generic breadth, limited only in that it must not cover any embodiment known in prior literature or products. Hence many applicants disclose in the specification only one or two embodiments covered by their generic claim. The central point of this article is: 112(6) says that where a functional expression is used, a determination of coverage is made by starting not with the generic claim language but with the often narrow structures shown in the disclosure portion of the patent. Equivalent structures are then added in to complete the coverage analysis.

in 1987¹⁷ and has been reinforced since then.¹⁸ It turns out that the coverage now accorded to such expressions is exactly what was sought by a certain inventor in the 1930s and refused by the Supreme Court in *Halliburton Oil Well Cementing Co. v. Walker*.¹⁹

To frame the background for *Halliburton* and for the controversy that ensued from it, a few basic principles of patent law must be reviewed. The first is that a patent application has two main components of interest here: (i) the disclosure portion, which includes the specification and drawings; and (ii) the claims.²⁰ Since disclosure of a single embodiment or version of the invention normally will support broad, generic claims,²¹ and since the claims are what traditionally have been thought to define a patent's coverage,²² the disclosure portions of most patents have been narrowly drafted to concentrate on one or two preferred embodiments. The claims, by contrast, are broadly worded in order to secure as much coverage for the patent as possible. When courts later interpret the claims in infringement actions, they generally do so without limiting the claims

17. See *Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1201 (Fed. Cir. 1987) (112(6) acts as a restriction on the literal satisfaction of a claim limitation); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987), cert. denied, 485 U.S. 961, cert. denied, 485 U.S. 1009 (1988). See also *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558 (Fed. Cir. 1986). While *Texas Instruments* did not mention the cutting-back effect of 112(6), the case probably represents the most dramatic example in the reported literature of that effect in action. The court affirmed an ITC administrative law judge's holding of noninfringement, even though the judge had found, and the appellate court agreed, that "every function in the [Texas Instruments] patent claims is performed by the accused calculators." *Id.* at 1567. The court's reasoning will be examined *infra*, part V.A.

18. See *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 (Fed. Cir. 1989) (paragraph 6 "operates to cut back on the type of means which could literally satisfy the claim language"); *Jonsson v. Stanley Works*, 903 F.2d 812, 819 (Fed. Cir. 1990) (same, citing *Johnston*).

19. 329 U.S. 1 (1946).

20. See 35 U.S.C. § 112, paras. 1-2 (1975). This section actually refers to the claims as the concluding part of the specification, but it is customary practice to speak of the claims as being apart from the specification because of the paramount importance of claim breadth in securing patent coverage.

21. The specification only needs to disclose one way of making and using the generically claimed subject matter. See 35 U.S.C. § 112, para. 1 (1975) (specification to set forth best mode contemplated by inventor for carrying out his invention); 37 C.F.R. § 1.71(b) (1988) (specification "must describe completely a specific embodiment of" the claimed invention). For this reason it was customary to draft the detailed portion of the specification narrowly. See the "preferred layout" of an application as recommended in U.S. Dep't of Commerce, Manual of Patent Examining Procedure § 608.01 (Mar. 1994).

22. See, e.g., Robert L. Harmon, PATENTS AND THE FEDERAL CIRCUIT 13 (3d ed. 1994) (claim provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using, or selling the protected invention). The claim is not interpreted as being limited to the preferred embodiments or specific examples contained in the specification. *Id.*

to the particular structures making up the embodiments shown in the patent's disclosure.²³

II. THE ROOT OF THE PROBLEM:

HALLIBURTON v. WALKER

The origins of 112(6) lie in the split of authority before the 1952 Act as to whether means-plus-function recitations in patent claims were (i) inherently indefinite,²⁴ (ii) indefinite only in claims drawn to a single means,²⁵ (iii) indefinite only if used at the "point of novelty,"²⁶ or (iv) not indefinite at all.²⁷ In particular, the drafters were attempting to address the 1946 Supreme Court decision in *Halliburton Oil Well Cementing Co. v. Walker*,²⁸ which held such language to be fatally indefinite. An understanding of the details of that case is essential to an understanding of the full circle in which the law has moved between 1946 and 1994 with respect to means-plus-function definitions of patented inventions.

23. See, e.g., *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1562 (Fed. Cir. 1986) (all possible variations are not required to be set out in the specification, and the court has cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification); *Sjolund v. Musland*, 847 F.2d 1573, 1582 (Fed. Cir. 1988) (general rule is that limitations from the specification are not to be read into the claims, since the claims define the invention).

24. See, e.g., *Tyden v. Ohio Table Co.*, 152 F. 183, 185 (6th Cir. 1907) (claim reciting means-plus-function is "substantially a claim for a function" which "cannot be upheld and must be held void").

25. See *General Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 368 (1938) (claim to lamp filament, in functional terms, was indefinite).

26. See, e.g., *Mead Johnson & Co. v. Hillman's, Inc.*, 135 F.2d 955, 958 (7th Cir.) ("functional statements cannot be availed of to define over the prior art"), *cert. denied*, 320 U.S. 752 (1943); *Farmers' Coop. Exch. v. Turnbow*, 111 F.2d 728, 732 (9th Cir.) (claim invalid for using "conveniently functional language at the exact point of novelty"), *cert. denied*, 311 U.S. 681 (1940).

27. See, e.g., *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405 (1908) (claim upheld as valid, reciting "means for operating the forming plate" and "means to cause said plate to oscillate" in combination with other elements).

28. 329 U.S. 1 (1946). For the proposition that 112(6) was intended to address *Halliburton*, see Charles J. Zinn, COMMENTARY ON NEW TITLE 35, U.S. CODE "PATENTS," reprinted in 1952 U.S.C.C.A.N. 2507, 2514. Mr. Zinn was law revision counsel to the House Judiciary Committee working on the bill, H.R. 7794, which became the 1952 Act. See also *In re Donaldson Co.*, 16 F.3d 1189, 1194 (Fed. Cir. 1994) (112(6) enacted "to statutorily overrule" holding in *Halliburton*).

A. *The Walker Depth-Measuring Scheme*

Mr. Walker was the plaintiff-patentee in the case, and the Halliburton company was the accused infringer. Walker was an oil field consultant. The Halliburton company was a large oil well services company that met the needs of members of the oil industry. The company cemented walls of wells to prevent earth cave-ins, perforated rock formations at the bottom of wells to permit greater oil flow, and assisted in pumping oil out of wells.

The purpose of Walker's patented invention was to make sure that during production of oil the downhole pump was always located substantially below the oil surface, hence in the proper position to draw oil out.²⁹ Prior efforts to do this had injected a sound pulse down into the well from the ground, and then "listened" at the ground to determine how long it took for the pulse echoes to travel down to the surface of the oil pool and back to ground level again. This method led to erroneous results.³⁰

Mr. Walker, like others before him, realized that the error inherent in prior measurements was due to the unpredictability of the velocity of sound in oil wells. He devised a system which bypassed that problem. His invention "listened" not only for the echo of the main sound pulse, but also for the echoes from the collars surrounding the various joints of tubing in the well.³¹ By counting the number of tubing collar echoes before the main echo from the oil surface, and knowing the distance between each pair of collars, Walker could determine very accurately the

29. See the Ninth Circuit's opinion in *Halliburton Oil Well Cementing Co. v. Walker*, 146 F.2d at 817, 818-20 (9th Cir. 1944).

30. Prior workers in this field had used the total return time of the echoes as a measure of the distance down to the pool of oil, erroneously assuming that the velocity of sound was constant throughout the well. This listening-for-the-echo in the prior technology was done electrically, with a microphone, amplifier, and recorder. The error in assuming the velocity of sound often led to misplacement of the production tubing and pump. One pair of workers, Lehr and Wyatt, had noticed the error in figuring the velocity of sound in wells, and had devised a corrective formula by which they tried to calculate the velocity in each particular well. Interestingly, this was admitted by Walker (*see* Brief for Cranford P. Walker, et al., Respondents at 8, *Halliburton Oil Well Cementing Co. v. Walker*, 326 U.S. 696 (1946) (No. 290)), but not urged by Halliburton, who characterized Lehr and Wyatt as a straight time measurement system, and sought to win the case by urging that the metes and bounds of Walker's claim were indefinite due to the use of functional language at the point of novelty. *See* Brief for Halliburton at 4-5, 9-10, *id.* Walker contended that even the correctional formula of Lehr and Wyatt did not lead to accurate results.

31. Brief for Cranford P. Walker, et al., Respondents at 8-9, *id.*

distance from the top of the well to the surface of the oil pool.³² If necessary, the pump's location then could be adjusted by raising or lowering the string of tubing to which the pump was attached.

Walker implemented his scheme in two versions. In one, he inserted into the top of the well a small tube, whose length he made adjustable so as to be particularly receptive to the echoes coming from the many successively deeper tubing collars in the well³³ and relatively unreceptive to other frequencies. He called this a resonator tube³⁴ and it was described in his '519 "acoustic" disclosure patent. His claim to a depth-measuring apparatus, in addition to reciting a sound source and a receiver for picking up echoes, included the following element: "means . . . for tuning said receiving means to the frequency of echoes from the tubing [coupling] collars . . . to clearly distinguish the echoes from said couplings from each other."³⁵

Walker realized that an analogous kind of signal-accentuation could be done electrically.³⁶ He filed a separate patent application for the electrical version.³⁷ His electrical echo-processor claim was rejected by the Patent Office for being an obvious equivalent of his acoustic version. The application with acoustic disclosure meanwhile issued and became the patent in suit in *Halliburton*.

B. Walker's "Means For" Claim Is Held Indefinite

Halliburton's accused infringing system was an electrical version.³⁸ Halliburton contended it was free to use an electrical filter in its echo-processor structure.³⁹ Walker of course disagreed.⁴⁰

32. Walker's scheme required some means to delineate sharply the rather weak echoes from the tubing collars, so as not to miss any of them. It was known at the time that such echoes existed, and that the frequency of each such echo was a function of the annular height of the open space outside an individual joint of tubing in the well (typically a tubing joint was twenty feet long at that time). *Id.*

33. The second harmonic would arrive at the surface simultaneously with the fundamental and other harmonics from the respective tubing collar.

34. *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 7 (1946).

35. *Id.* at 9, n.7.

36. This he did by inserting a microphone into the well, electrically filtering the microphone's output signal to accentuate a harmonic of the tubing-section-echo signals, and using the filtered electrical signal to drive the same kind of stylus he was using in the acoustic version of his invention.

37. Brief for Halliburton at 38-39, *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 696 (1946) (No. 290).

38. *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 121 (1946).

39. Brief for Halliburton Oil Well Cementing Co., Petitioner, On Reargument Before a

The district court⁴¹ and the Ninth Circuit⁴² found Walker's '519 acoustic-disclosure patent valid and infringed. The appellate court relied on the equivalency between Walker's use of acoustical resonance and Halliburton's use of electrical resonance for the same purpose.⁴³ There was never any contention by Walker that his "means" expression covered all means for accomplishing the stated function, but rather only those structures equivalent to what his specification showed. The Ninth Circuit's decision was grounded on the view that Halliburton was using not just any equipment for determining depth by listening for and counting tubing collar echoes, but equipment which in the context of Walker's discovery about tubing-collar echoes was the full equivalent of the tuning pipe disclosed in Walker's specification.⁴⁴

On certiorari, the Supreme Court at first affirmed per curiam by an equally divided court.⁴⁵ A petition for rehearing was granted,⁴⁶ resulting in a reversal of the Ninth Circuit's decision and a holding that Walker's patent claim was invalid.⁴⁷ The ground was solely a supposed indefiniteness of the phrase: "means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from

Full Bench at 47-85, *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1 (1946) (No. 24). Halliburton contended primarily: (a) such a device was not equivalent to Walker's disclosed acoustical resonator tube; (b) Halliburton's use of a known electrical filter to accentuate tubing-coupling echoes was merely an obvious design expedient drawn from the prior art and not from Walker's work; and (c) Walker, despite efforts to do so in the Patent Office, had been unable to obtain allowance of his electrical-filter claim, which would have squarely covered the accused Halliburton arrangement.

40. Walker contended that: (a) at trial he had proved equivalence between his disclosed acoustical resonator and Halliburton's electrical filter, both used to accentuate tubing-collar echoes in order to obtain a more accurate distance measurement to the surface of the downhole oil, as conceived by him; (b) the Patent Office had regarded acoustical and electrical filtering to be so obviously equivalent in the context of Walker's invention that it had refused Walker's electrical application in light of his acoustic application; and (c) since the language of the claim in suit was clear, was no broader than Walker's contribution to the art, and squarely embraced Halliburton's electrical structure, it would be unjust to restrict the claim's coverage to merely the acoustical embodiment disclosed in the Walker specification. Brief on Rehearing for Cranford P. Walker, et al., Respondents at 28-36, *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1 (1946) (No. 24).

41. *Walker v. Halliburton Oil Well Cementing Co.*, 59 U.S.P.Q. (BNA) 179 (S.D. Cal. 1943).

42. *Halliburton Oil Well Cementing Co. v. Walker*, 146 F.2d 817, 818-21 (9th Cir. 1944), *reh'g denied*, 149 F.2d 896 (9th Cir. 1945).

43. *Id.* at 819-21.

44. *Id.*

45. *Halliburton Oil Well Cementing Co. v. Walker*, 326 U.S. 696 (1946).

46. *Halliburton Oil Well Cementing Co. v. Walker*, 327 U.S. 812 (1946).

47. *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1 (1946).

the tubing collars"⁴⁸

C. Analysis of the Case

Walker's brief before the Supreme Court on rehearing makes clear that he sought to cover *some* range of equivalents of his tuning pipe. His lawyers argued that it was the "intention of both Walker and the Patent Office that this patent should cover not only the tuning pipe 18 [of the specification] but also other equivalent mechanisms which could be used for the purpose of carrying the patented invention into practice."⁴⁹

However, Walker was not endeavoring to have his claim cover *all* possible means for tuning the receiver to listen for tubing-collar echoes. He appears to have been urging only that his "means for" expression should be read to cover his specific "tuning pipe 18" plus equivalents of that specific structure. This would presumably be a significantly smaller class of things than "all means" for tuning, due to the requirement inherent in the term "equivalent" that any covered structure must work in substantially the same way as an acoustic tuning pipe.⁵⁰ Thus Walker was contending for a ruling virtually identical to the present wording of 112(6).

The Supreme Court nevertheless accused Walker of attempting to cover all possible means for carrying out the recited function:

Under these circumstances the broadness, ambiguity, and overhanging threat of the functional claim of Walker becomes apparent. What he claimed in the court below and what he claims here is that his patent bars anyone from using in an oil well any device heretofore or hereafter invented which combined with the [previously known] Lehr and Wyatt machine performs the function of clearly and distinctly catching and recording echoes from tubing joints with regularity.⁵¹

48. *Id.* at 8-9, 12.

49. Brief on Rehearing for Cranford P. Walker, et al., Respondents at 29, *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1 (1946) (No. 24).

50. Equivalents in patent law are things that work in substantially the same way to achieve substantially the same result. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950).

51. *Halliburton*, 329 U.S. 1, 12 (1946).

The Court was concerned that such a reach—which it does not appear Walker was seeking at all—would stifle future creativity:

In this age of technological development there may be many other devices beyond our present information or indeed our imagination which will perform that function and yet fit these claims. And unless frightened from the course of experimentation by broad functional claims like these, inventive genius may evolve many more devices to accomplish the same purpose.⁵²

The Court's concern was with the major philosophical issue of the patent laws: since a specification is often written narrowly and the claims broadly, how much legal scope *should* be accorded to such claims when the courts are called upon to interpret them? This is a question that has yet to be addressed adequately by Congress or answered by the courts. Unfortunately, the problem was obscured in *Halliburton* by the Court's grounding of its decision on a supposed indefiniteness of functional language. There was no sound reason to think that Walker's phrasing was indefinite.

The real problem suggested by the Court's language was the difficulty of determining when patent exclusivity goes too far in breadth and therefore provides a disincentive for later research. Should the claim (and hence the patent grant) be limited only by the prior art, i.e., valid so long as it is not so broad as to cover apparatus appearing in,⁵³ or obvious from,⁵⁴ prior work? Or should the claim be read to have a breadth in some way proportional to the particulars of the embodiments shown in the specification and drawings? Rather than tackle this formidable question, the Court grounded its decision on a supposed inaccuracy in the breadth of Walker's claim: "Had Walker accurately described the machine he claims to have invented, he would have had no such broad rights to bar the use of all devices now or hereafter known which could accent

52. *Id.*

53. A patent claim is invalid for anticipation under 35 U.S.C. § 102 if a single embodiment within its scope appears in prior literature or products. *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1562 (Fed. Cir. 1991); *In re Lukach*, 442 F.2d 967, 970 (C.C.P.A. 1971).

54. Obviousness of any one embodiment of the claim in light of the prior art at the time the claimed invention was made will invalidate the claim under 35 U.S.C. § 103. *In re Klein*, 987 F.2d 1569, 1570 (Fed. Cir. 1993).

waves."⁵⁵

The Court's ultimate conclusion that "the claims before us . . . fail adequately to describe the alleged invention"⁵⁶ was only a temporary shelter by which the Court could avoid the far more vexing and pervasive question of modern patent jurisprudence, viz., how broad *should* the scope of a patent be?

D. Congress Acts

The Congressional attempt in 112(6) to address in some way the unfairness of *Halliburton* was a step in the right direction. Means-plus-function language in defining combination inventions no longer was to be per se indefinite, hence the precise basis for the *Halliburton* decision was overruled. But the quid pro quo for the new statutory permission was to be substantial: such expressions in patent claims were not to be accorded their full colloquial scope, but rather would be limited to structures shown in the disclosure portion of the patent and the equivalents of such structures.

The issue of how the constraint of 112(6) plays out must be considered from several different perspectives:

- (a) In interpreting a claim to see if it impermissibly embraces versions of the invention which are not "statutory" subject matter, i.e., versions which are not eligible for patent protection,⁵⁷ does the restrictive second part of 112(6) operate to hold the claim to permissible subject matter and thereby save its patentability?

- (b) In interpreting a claim to see if it impermissibly includes a version of the invention which is not new,⁵⁸ or which was obvious at the time of the invention,⁵⁹ does the restrictive part of 112(6) help to

55. *Halliburton*, 329 U.S. 1, 13 (1946).

56. *Id.* at 14.

57. For example, mental processes are non-statutory. See, e.g., *In re Prater*, 415 F.2d 1393 (C.C.P.A. 1969).

58. See 35 U.S.C. §§ 101, 102 (1988) (limiting patentability to new machines, processes, etc.).

59. See 35 U.S.C. § 103 (1988) (prohibiting patentability of inventions which would have

save the claim?

- (c) In interpreting a claim to see whether it has been infringed, does the constraint of 112(6) operate to render an accused structure noninfringing even though it contains some sort of "means for" doing the function recited in the claim?

Succeeding sections hereof will separately address each of these facets of 112(6).

III. APPLICABILITY OF 112(6) TO STATUTORY SUBJECT MATTER ISSUES

A. *Iwahashi and Its Aftermath*

For purposes of defining statutory subject matter the question of whether a means-plus-function expression is subject to the narrowing influence of 112(6) was seldom addressed prior to 1990. One case that addressed this, though only in dictum, was *In re Bernhart*.⁶⁰ This was one of the early cases treating the question of statutory subject matter with reference to functions implementable on general purpose digital computers. In concluding that the mechanical drawing apparatus⁶¹ was statutorily eligible for patent protection, the court in *Bernhart* observed that 112(6) limited the coverage of the claim's "means" expressions to "only such mechanical drafting means and their equivalents."⁶² The claim did not embrace mental implementations, and was therefore statutory.

The issue of applying 112(6) to statutory subject matter decisions was not thoroughly addressed by the courts until the 1990 decision of the Federal Circuit in *In re Iwahashi*.⁶³ The case involved data-processing equipment for voice-recognition use. The high speed apparatus was designed to carry out a mathematical function known as auto-correlation. On appeal from a PTO rejection was an apparatus claim for a combina-

been obvious to a person of ordinary skill when made).

60. 417 F.2d 1395 (C.C.P.A. 1969).

61. The claimed apparatus plotted mechanical drawings automatically based on input dimensional data about the object being drawn. *Id.* at 1396-97.

62. *Id.* at 1399.

63. 888 F.2d 1370 (Fed. Cir. 1990).

tion of elements, all but one of which (the read-only memory) were expressed in means-plus-function language. The PTO Board of Appeals had rejected the claim under *Gottschalk v. Benson*⁶⁴ and its progeny,⁶⁵ as essentially preempting a mathematical algorithm and hence being drawn to nonstatutory subject matter.

The Federal Circuit reversed, reasoning that the claim defined relationships among structural components rather than a mathematical algorithm.⁶⁶ After stating its holding, the court took issue with a statement in the PTO Solicitor's brief to the effect that the claim on appeal "encompasses any and every means for performing the functions recited therein."⁶⁷ The court, noting that the claim was for a combination of parts all but one of which were in means-plus-function terminology, stated: "The claim is therefore subject to the limitation stated in 35 U.S.C. 112 para. 6 that each means-plus-function definition 'shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.'"⁶⁸

Immediately following this passage came a footnote,⁶⁹ wherein the

64. 409 U.S. 63 (1972).

65. See *infra* note 79.

66. See also *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980) (holding that a claim involving a mathematical algorithm could be statutory if the algorithm is implemented in a specific manner to define structural relationships among the physical elements of the claim). *Id.* at 767.

67. *Iwahashi*, 888 F.2d at 1375.

68. *Id.*

69. The famous "footnote 1" in *Iwahashi* read:

The accuracy of this statement may be questioned in view of a sentence in the opinion in *In re Sweet*, 393 F.2d 837, 841-42, 157 USPQ 495, 499 (CCPA 1968), which reads: "[A] recitation of 'means' [sic] for performing a function is interpreted broadly to cover all means capable of performing the stated function and is not limited to the particular structure which the application may disclose." (Emphasis added.) This statement, considered in a vacuum, is partly true and partly untrue. It must be read, however, in light of the opinion as a whole. It should not be removed from its context. The untrue part is the initial statement that the means clause is interpreted to cover all means to perform the function. It should have said it is interpreted to cover the means disclosed and all equivalents thereof which perform the function. The immediately preceding two paragraphs of the opinion show that the court actually was reading the "means" clause "in the light of 35 U.S.C. 112 [last paragraph]," just as we are doing here. The statute is set forth in note 5. The truth of the emphasized portion of the above sentence is beyond question because the "means" clause includes equivalents of the disclosed structure. Section 112 ¶6 cannot be ignored when a claim is before the PTO any more than when it is before the courts in an issued patent.

court undertook to explain away a passage in *In re Sweet*⁷⁰ which seemed to say that means expressions should be interpreted broadly to cover all means for achieving the recited function.

This "footnote 1" of *Iwahashi* has come to be rather well known. Less than three months after the decision in *Iwahashi*, the PTO took pains to announce that the court's opinion therein did not alter the PTO's view of statutory subject matter under Section 101: in judging whether a claim impermissibly embraced nonstatutory subject matter, a "means for" expression would be deemed by the PTO examiner to cover *all* means for carrying out the recited function.⁷¹ Acting Assistant Commissioner Denny issued a notice stating that the court's view of such expressions, as recited in footnote 1 of *Iwahashi*, was "directly contrary to precedent."⁷² For PTO examination purposes such expressions would not be impacted by 112(6), would be deemed to cover any and all means for carrying out the recited function, and hence would be more likely to be rejected as embracing nonstatutory subject matter.

The PTO was correct that there did not appear to be any logical basis to differentiate claim scope for purposes of prior-art comparison⁷³ from claim scope for purposes of judging whether the claim embraced any nonstatutory subject matter. The problem was whether either issue should be decided on bases other than as expressed in 112(6) and, more generally, whether pre-issuance PTO proceedings to obtain a patent should be conducted on criteria which are *different from* the criteria used by the courts in reaching post-issuance judgments on that same patent, the statutory provisions governing both types of proceedings being the same.

B. *The Seeming End of the Road: Arrhythmia*

The Federal Circuit has had one more opportunity to pass on this contentious issue, although it was in a case to which the PTO was not a party. In *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*,⁷⁴ the court dealt with an appeal from a district court infringement litigation

Id. at 1375 n.1 (punctuation and citations as in original).

70. 393 F.2d 837, 841-42 (C.C.P.A. 1968).

71. The claim would thus be more likely to be rejected as embracing forbidden subject matter.

72. James E. Denny, *Notice Interpreting In re Iwahashi*, 39 Pat. Trademark & Copyright J. (BNA) 399 (1990), reprinted in 1112 OFF. GAZ. PAT. OFFICE 16 (Mar. 13, 1990).

73. See *infra* part III.

74. 958 F.2d 1053 (Fed. Cir. 1992).

decision granting summary judgment of invalidity of a patent on the ground of nonstatutory subject matter.⁷⁵ The invention involved a method and computerized apparatus for analyzing a heart-attack patient's EKG, to determine whether or not the patient was prone to tachycardia and ventricular fibrillation in the hours immediately after the attack.

Some of the claims of the patent in suit were to the method of analyzing the EKG; others were to the apparatus for doing so. The apparatus claims were in means-plus-function language,⁷⁶ and the district court had summarily held them invalid for failure to claim statutory subject matter.⁷⁷

The appellate court, in a two-sentence paragraph citing *Iwahashi*, held that in view of the language of 112(6) "the statutory nature vel non of [the patentee's] claims is determined with reference to the description in the ... specification."⁷⁸ The court proceeded to rule that the specification

75. *Id.* at 1054.

76. The court treated claim 7 as typical. *Id.* at 1055. The claim read as follows:

7. Apparatus for analyzing electrocardiograph signals to determine the level of high frequency energy in the late QRS signal [a part of the heart's electrical cycle, in which high-frequency energy at a low voltage level is an indicium of susceptibility to tachycardia if] comprising:

means for converting X, Y, and Z lead electrocardiographic input signals to digital valued time segments;

means for examining said X, Y, and Z digital valued time segments and selecting therefrom the QRS waveform portions thereof;

means for signal averaging a multiplicity of said selected QRS waveforms for each of said X, Y, and Z inputs and providing composite, digital X, Y, and Z QRS waveforms;

high pass filter means;

means for applying to said filter means, in reverse time order, the anterior portion of each said digital X, Y, and Z waveform; and

means for comparing the output of said filter means with a predetermined level to obtain an indication of the presence of a high frequency, low level, energy component in the filter output of said anterior portions.

Id. The central novelty was said to be in the reverse-order filtering of the late QRS sample signals. *Id.* The PTO had granted this claim without questioning whether it was statutory. *Id.*

77. Although the language of 112(6) expressly applies to a "means or step," the court did not mention 112(6) in its treatment of the method claims. *See id.* at 1058-61.

78. *Id.* at 1060.

did not address any abstract mathematical solutions or logical algorithms⁷⁹ but rather a heart-attack patient's EKG, a non-abstract technological area clearly within the reach of the patent laws.⁸⁰

The PTO saw in *Arrhythmia* no reason to depart from the contrary views of 112(6) expressed in the "Denny Notice"⁸¹ and continued to ignore 112(6) in interpreting means-for expressions in claims before the PTO. The struggle between the court and the PTO on this issue was to escalate dramatically.

C. The Commissioner Enters the Fray: Alappat

Up until this time, the PTO's views had not been expressed by the Commissioner personally. The notice by Assistant Commissioner Denny had been in rather routine form. Now, however, the stage was set for the Commissioner⁸² to assert a position contrary to the court's, and to do so by intruding personally upon the work of the Board of Patent Appeals and Interferences.⁸³

The case in which this happened was *Ex parte Alappat*.⁸⁴ A three-

79. Coverage of a logical algorithm per se, unrelated to a particular end use, was found nonstatutory in *Gottschalk v. Benson*, 409 U.S. 63, 72 (1972). The ruling has been the source of extensive commentary and refinement in later cases. See, e.g., *Parker v. Flook*, 437 U.S. 584, 591 (1978) (holding that preemption of algorithm is one basis for finding a claim nonstatutory, and suggesting that a mathematical algorithm in a claim should be disregarded in reaching the conclusion on its statutory material); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981) (finding rubber-curing claim statutory even though it involved algorithm for solving Arrhenius' equation); *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978) (establishing a two-part test to determine whether the claim is statutory: (1) seeing if claim involves algorithm; (2) determining whether claim as a whole is no more than the algorithm itself); *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980) (same); Donald S. Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959 (1986) (arguing that *Diehr* in part superseded *Benson* and *Flook*.)

80. *Arrhythmia*, 958 F.2d at 1060-61. The court noted that the final output of the apparatus was a measure, in microvolts, of voltage at the heart's ventricle. *Id.* at 1060.

81. See *supra* note 72.

82. The Commissioner also serves as Assistant Secretary of Commerce. See 35 U.S.C. § 3(d) (1988).

83. Pursuant to 35 U.S.C. § 7(a) (1988), this board consists of the Commissioner, the Deputy Commissioner and the two Assistant Commissioners, all of whom are Presidential appointees with advice and consent of the Senate, 35 U.S.C. § 3(a) (1988), plus the examiners-in-chief, who are appointed by the Secretary of Commerce on the nomination of the Commissioner. *Id.*

84. 23 U.S.P.Q.2d (BNA) 1340 (Bd. Pat. App. & Interferences-1992). An appeal from the decision was taken *en banc* by the Federal Circuit. See *In re Alappat*, 980 F.2d 1439 (Fed. Cir. 1992). The court directed the parties to brief various issues regarding the Commissioner's authority: Could the Commissioner augment the panel's membership and subsequently order a rehearing after the panel had rendered a decision contrary to the PTO's

member panel of the Board decided the case⁸⁵ in the applicant's favor by applying 112(6) in accord with the Federal Circuit's interpretation thereof in *Ivashiki*. The Commissioner determined that a rehearing should be granted and that he and four other senior PTO officials should be added to the panel.⁸⁶ The newcomers became the majority, changing the decision in the case by adhering to the PTO view that 112(6) does not apply in PTO proceedings. The three original panel members dissented, urging that the Federal Circuit's view, not the PTO's view, on means-plus-function claims was the law of the land.

Alappat concerned a patent application involving a "rasterizer" for sampling an incoming electrical signal frequency and recording internally the magnitudes sampled. These internal data can then be manipulated to produce a visually displayed waveform that is a modified form of the incoming signal, corrected for aberrations that may have corrupted the incoming signal before it was received.⁸⁷ The claim in issue called for a combination which included a "means for" looking up point locations in a table created from incoming, non-standardized data, then adjusting the position data to fit the nearest available standardized locations on the screen, and finally displaying the set of new points as a smooth line.⁸⁸ The apparatus disclosed in the application's specification involved arithmetic logic units to determine the standardized point positions.⁸⁹

The Board majority took the view that all the functions listed in the "means for" recitations of the claim could be done in a programmed

official view on 112(6)? The decision of the Board was reversed. See *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994).

85. Decisions by three-member panels are authorized by 35 U.S.C. § 7(b) (1988) and are the normal way that most appeals are disposed of by the PTO. The Commissioner or his delegate does have the power, however, to order a larger group of the Board to hear the appeal. Section 7(b) allows the Commissioner to appoint additional members of the Board to hear a given appeal, provided that "at least three members of the Board" are so designated. In some instances, to maintain timeliness of the PTO work product, the Commissioner can designate a lower-ranking PTO official to sit on a Board panel. See 35 U.S.C. § 7(c) (1988).

86. The appointees were: Commissioner Manbeck, Deputy Commissioner Comer, Assistant Commissioner Samuels, Board Chairman Serota, and Board Vice Chairman Calvert. *Ex parte Alappat*, 23 U.S.P.Q.2d (BNA) at 1340.

87. The court characterized this as "an electrical device that converts waveform magnitude data into an array of intensity data for use in creating a smooth waveform display." *Id.* at 1350.

88. See *id.* at 1341 (claim 15).

89. The inventor did not provide further detail about how the standardized point positions are determined. The majority opinion mentioned a barrel shifter for doing the normalizing, ROMs for outputting data, and a table-lookup means, in addition to the arithmetic logic units. *Id.* at 1344.

digital computer, and that 112(6) did not operate to limit the meaning of the claim terminology in any way.⁹⁰ Thus read without regard to 112(6), the majority went on to hold that the claim effectively preempted a logical algorithm and hence was nonstatutory under the Supreme Court case law described above.⁹¹

The Board majority took express note⁹² of the Federal Circuit's recent decision in *Arrhythmia*,⁹³ but sought to distinguish it on the grounds that: (1) the claims in *Arrhythmia* were more specifically drawn;⁹⁴ and (2) *Arrhythmia* was an appeal from an infringement action involving a patent, and the rules of claim construction in infringement actions are different than the rules for claim interpretation during *ex parte* prosecution.⁹⁵

Before the Commissioner ordered reconsideration by the expanded panel, the Board members who decided the appeal had, of course, come out the other way. Now, they expressed considerable indignation over the new majority's opinion.⁹⁶ They asserted that *In re Iwahashi*⁹⁷ stood for "the proposition that claims drafted in 'means for' format are to be construed in light of the disclosed means for performing the functions and the equivalents thereof in accordance with the sixth paragraph of 35 U.S.C. 112 in determining whether they are statutory or nonstatutory under 35 U.S.C. 101."⁹⁸

The stage was now set for the Federal Circuit to state definitively whether means-plus-function claims were to be interpreted more broadly in a PTO proceeding than in district court actions.

D. The Federal Circuit Responds: One Harmonious Chord in a Dissonant Sea

On appeal, the Federal Circuit took the case *en banc*, obviously distressed by the Commissioner's apparent "stacking" of the panel with

90. *Id.* at 1345. The board majority specifically stated that the "'means' of claim 15 read on any and every means for performing the functions." *Id.*

91. *Id.* at 1347.

92. *Id.*

93. *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 958 F.2d 1053 (Fed. Cir. 1992). See *supra* part III.B.

94. *Ex parte Alappat*, 23 U.S.P.Q.2d (BNA) at 1347.

95. *Id.*

96. See *id.*

97. 888 F.2d 1370 (Fed. Cir. 1989). See *supra* part III.A.

98. *Ex parte Alappat*, 23 U.S.P.Q.2d (BNA) at 1349.

members who shared his views on 112(6).⁹⁹ However, in deciding the case the Federal Circuit judges themselves were far from accord on most of the issues raised by the appeal, issuing seven separate opinions.¹⁰⁰

The single point of accord among all the judges who reached the merits in *Alappat* was on the subject of 112(6): all found that the expanded panel had erred in not applying the limiting effect of 112(6) to the claims in determining whether they were statutory.¹⁰¹ In other words, the PTO could not ignore the statute any more than district courts could.

E. Prelude to a Peace Accord?

It now appears that with a new Commissioner in office¹⁰² the PTO may

99. See *In re Alappat*, 980 F.2d 1439 (Fed. Cir. 1992).

100. *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (en banc). On the question of whether the enlarged rehearing panel was so infirmly constituted that its ruling was not an appealable "decision" at all, Judge Rich, joined by Judges Lcurie, Newman, and Rader, said the panel was properly constituted. Chief Judge Archer and Judges Nies and Plager concurred in the conclusion. *Id.* at 1530, 1545, 1577. Judges Mayer and Michel dissented, *id.* at 1571, as did Judges Schall and Clevenger, *id.*

On the merits of the appeal, Judge Rich ruled that *Alappat's* claim, properly interpreted per 112(6), was statutory subject matter. *Id.* at 1530. Judge Newman also issued a concurring opinion. Judge Newman explained that she thought the patent system should be open to new technologies and should not be bogged down in squabbles about principles of mathematics being outside its reach. *Id.* at 1568. Judge Rader did the same. Judge Rader reasoned that the Supreme Court's decision in *Diamond v. Diehr*, 450 U.S. 175 (1981), severely constrained earlier Supreme Court decisions against algorithms being patentable subject matter. An algorithm is not patentable subject matter only where the sole discovery defined by the claim was a principle of nature itself. *Id.* at 1581.

Judge Plager also issued a separate opinion, which did not address the patentable subject matter issue, other than to say that the panel erred in its failure to follow 112(6) and that he applauded Judge Rich's "chasing out of some of the less useful accretions regarding patentability under § 101." *Id.*

Two of the remaining five judges, Archer and Nies, dissented on the merits. These judges took the view that the majority were disregarding the constraints on patentable subject matter imposed by prior cases. *Id.* at 1545. The other three judges (Mayer, Clevenger, and Schall) said that in view of the panel's having been improperly constituted there was no decision to review, and accordingly they had no opinion on the merits. See *id.* at 1571 (Mayer, J., dissenting, joined by Michel, J., on this point); *id.* at 1583.

101. *Id.* at 1540 (Rich, J.) (arguing it was error for panel to refuse to apply 112(6) in rendering its § 101 patentable subject matter determination); *id.* at 1561 (Archer, C.J., concurring and dissenting in part) (agreeing that panel erred in failing to apply narrowing constraint of 112(6) in patentable subject matter determination but finding the issue a "red herring"); *id.* at 1568 (Newman, J., concurring) (joining Judge Rich on the merits and expressing additional views); *id.* at 1577 (Plager, J., concurring) ("there is no doubt that the Board erred as a matter of law in refusing to apply § 112 [para.] 6 as we have instructed"); *id.* at 1581 (Rader, J., concurring) ("the Board reached its conclusion by impermissibly expanding the scope of the claimed subject matter, thereby running afoul of 35 U.S.C. § 112, [para.] 6").

102. Commissioner Bruce Lehman took office August 6, 1993. *Legislation: Senate*

have ameliorated its hostility to applying 112(6) in PTO proceedings. In the new Examiner Guidelines published April 28, 1994, the Office announced that in prior art determinations it would now apply 112(6), in light of numerous Federal Circuit holdings to the effect that it must do so.¹⁰³ The literal wording of the new guidelines would also apply to statutory subject matter determinations, since the guidelines are phrased in terms of how examiners should interpret functional language in claims.¹⁰⁴

Nevertheless, it is not entirely clear whether the PTO has capitulated to the 112(6) aspect of the Federal Circuit's *Alappat* decision. As noted above, all eight judges addressing the issue in *Alappat* said the narrowing effect of 112(6) applies to PTO determinations of whether claims are properly in accord with statutory subject matter requirements.¹⁰⁵ The new guidelines, issued several months before *Alappat* was decided, were promulgated in response to *In re Donaldson*.¹⁰⁶ *Donaldson* involved only an obviousness rejection under Section 103. Moreover, the guidelines say *Donaldson* affects 112(6) and does not "directly affect the manner in which any other section of the patent statutes is interpreted or applied."¹⁰⁷ This passage leaves it unclear whether the new guidelines will impact PTO determinations of statutory subject matter under Section 101.

The PTO should acquiesce on statutory subject matter determinations as it has now acquiesced on prior art determinations. That result would

Confirms Bruce Lehman for Commissioner of Patents and Trademarks, 46 Pat. Trademark & Copyright J. (BNA) 311 (1993).

103. For the text of the new guidelines, see Charles E. Van Horn, *PTO Notice on Means or Step Plus Function Limitation Under 35 U.S.C. Section 112, 6th Paragraph*, 47 Pat. Trademark & Copyright J. (BNA) 571 (1994). The PTO intends to incorporate the guidelines into the Manual for Patent Examining Procedure. *Id.* See *infra* part IV (discussing cases which led to the new guidelines involving 112(6) in determinations of patentability over the prior art).

104. The guidelines recite in part:

The purpose of this memo is to set forth guidelines for the examination of § 112, 6th paragraph "means or step plus function" limitations in a claim. . . . [E]ffective immediately, examiners shall interpret a § 112, 6th paragraph "means or step plus function" limitation in a claim as limited to the corresponding structure, materials or acts described in the specification and equivalents thereof in accordance with the following guidelines.

Id.

105. See *supra* note 101 and accompanying text.

106. 16 F.3d 1189 (Fed. Cir. 1994).

107. Van Horn, *supra* note 103 at 571. Footnote 10 to the new guidelines mentions the statutory subject matter context of 112(6) but does not specify whether examiners are to treat means expressions in the 112(6) manner when judging patentable subject matter.

be far better than perpetuating the strain between the court and the PTO.¹⁰⁸

IV. APPLICABILITY OF THE STATUTE TO NOVELTY AND OBVIOUSNESS DETERMINATIONS

Whether 112(6) applies in determining patentability over the prior art under Sections 102 and 103 has also been the subject of significant debate and disagreement between the PTO and the Federal Circuit. This conflict has perhaps been even more rancorous than the disagreement over the applicability of 112(6) to statutory subject matter determinations.

The issue, at least for purposes of judging patentability of a claim over the prior art, is whether a means-plus-function expression in a patent claim reads on all means for achieving the function, or whether 112(6)¹⁰⁹ causes such a recitation to be construed as embracing only the structures shown in the specification plus their equivalents. In *In re Bond*¹¹⁰ the Federal Circuit held that 112(6) applied to such a patentability determination. The invention involved a delay circuit used in connection with telephone-answering machines. The claim under consideration in the PTO recited "delay means." The specification showed digital delay circuitry and a prior-art reference showed analog circuitry, both for performing what the PTO viewed as the recited function in the claim.¹¹¹ The court held that 112(6) applies to novelty determinations: "While a 'means-plus-function' may appear to include all means capable of achieving the desired function, the statute [112(6)] requires that it be 'construed to cover the corresponding structure, material, or acts described in the

108. Unfortunately there are signs that Commissioner Lehman will follow the practice of some of his predecessors in declining to follow certain Federal Circuit decisions which are handed down by a three-judge panel and deemed by the PTO to conflict with prior authority. See *PTO Will Not Follow CAFC Decision on Obviousness of Chemical Compounds*, 47 Pat. Trademark & Copyright J. (BNA) 500 (1994) (indicating that Commissioner Lehman had issued an internal PTO memorandum instructing examiners to disregard *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994) (holding that a chemical compound was not prima facie obvious merely because it was embraced within a generic claim of a prior U.S. patent), as being out of accord with prior cases).

109. For the text of 112(6), see *supra* text accompanying note 13.

110. 915 F.2d 831 (Fed. Cir. 1990).

111. *Id.* at 832-34. The court was unsure about whether the prior art reference had any structure to accomplish the recited delay function. The court remanded the determination by the PTO on that point. *Id.* at 835.

specification and equivalents thereof.”¹¹²

The court cited *In re Iwahashi*¹¹³ for the proposition that 112(6) applies equally to court and PTO determinations,¹¹⁴ and *Johnston v. IVAC Corp.*¹¹⁵ for the proposition that “Section 112 para. 6 operates to cut back on the types of means which could literally satisfy the claim language.”¹¹⁶ The PTO board performed no equivalency analysis. Its anticipation finding was vacated and the case remanded for an equivalency analysis.¹¹⁷

Reaction from the PTO came two years later. In *Ex parte Isaksen*,¹¹⁸ decided by an expanded Board panel including both Commissioner Manbeck and Chairman Serota, the panel expounded at length on the PTO’s view that 112(6) was inapplicable to PTO proceedings; that since an applicant before the PTO, unlike a litigant in the federal courts, can readily amend his claims, there is no reason to permit reliance on 112(6); that the history of 112(6) as a response to the validity and infringement concerns of the Supreme Court in *Halliburton* signifies that it is inapplicable to PTO proceedings; that commentaries at the time of enactment indicate that 112(6) was not intended to operate on patentability questions, and especially not before the Patent Office; that authority prior to *Bond* was nearly uniformly the other way; and that a host of perceived practical problems would result from the PTO’s following *Bond*.¹¹⁹ The panel concluded that in PTO proceedings regarding patentability, unlike court proceedings regarding validity, means-plus-function expressions are deemed to include all possible means for carrying out the recited function.¹²⁰ Six days later, the Commissioner released a detailed Notice setting forth the same analyses and positions.¹²¹ The painstaking detail of the PTO’s analysis suggests that the PTO took the issue very seriously.

112. *Id.* at 833.

113. 888 F.2d 1370, 1375 n.1 (Fed. Cir. 1989). See *supra* notes 60-72 and accompanying text.

114. See also Carl H. Moy, *The Interpretation of Means Expressions During Examination*, 68 J. PAT. OFF. SOC’Y 246 (1968). *Iwahashi* was actually a statutory subject matter case under Section 101.

115. 885 F.2d 1574 (Fed. Cir. 1989).

116. *In re Bond*, 910 F.2d at 833 (citing *Johnston*, 885 F.2d at 1580).

117. *Id.*

118. 23 U.S.P.Q.2d (BNA) 1001 (Bd. Pat. App. & Interferences 1991).

119. *Id.* at 1007-15.

120. *Id.* at 1015. The panel stated as to the case before it: “Any means capable of performing the recited function meets the claim due to the scope of pending means claims discussed *infra*.” *Id.* at 1006.

121. Harry K. Manbeck, Jr., *PTO Notice On Application of 35 U.S.C. 112 para. 6*, 43 Pat. Trademark & Copyright J. (BNA) 161 (Dec. 19, 1991), reprinted in 1134 OFF. GAZ. PAT. OFF. 631 (Jan. 7, 1992).

The Federal Circuit in February, 1994 responded *en banc* with *In re Donaldson Co.*¹²² With *Alappat* still pending before the court *en banc* to resolve Section 101 patentable subject matter determinations, *Donaldson* squarely addressed the PTO's position of disregarding the limiting effect of 112(6) when judging patentability over prior art under Sections 102 and 103. The case involved re-examination of an air-cleaning systems patent. The Examiner had rejected the claim on the ground of obviousness, and the Board affirmed.¹²³

The patent owner, Donaldson, effectively conceded that a prior art reference disclosed every element of the claim but one.¹²⁴ That element was written as a "means" expression, for moving particulate matter (typically dust) in a downward direction toward a collecting hopper, in response to pressure changes in a dirty-air filtering chamber.¹²⁵ The prior art taught the use of air-pressure pulses to dislodge dust stuck to the outsides of air-filter elements. However, Donaldson's patent disclosed in its specification and drawings a flexible-walled arrangement for the collecting hopper. The hopper thus acted like a diaphragm, expanding in response to periodic air pulses, and returning to its original shape after each air pulse.¹²⁶ This avoided the prior problem of dust and debris caking on the walls of the hopper and becoming difficult to remove.

The court pointed out that this kind of language is read according to the restrictive mandate of 112(6):

The plain and unambiguous meaning of paragraph six is that one construing means-plus-function language in a claim must look to the specification and interpret that language in light of the corresponding structure . . . described therein, and equivalents thereof, to the extent that the specification provides such disclosure. Paragraph six does not state or even suggest that the PTO is exempt from this mandate, and there is no legislative history indicating that it should be.¹²⁷

122. 16 F.3d 1189 (Fed. Cir. 1994).

123. *Id.* at 1191.

124. *Id.* at 1192.

125. The claim language in issue read: "a lowermost portion in said filtering chamber . . . for collection of particulate matter, said portion having means, responsive to pressure increases in said chamber . . . for moving particulate matter in a downward direction to a bottommost point in said portion for subsequent transfer to a location exterior to said assembly." *Id.* at 1191.

126. *Id.* at 1190-91.

127. *Id.* at 1193 (footnote omitted). In a lengthy footnote the court reviewed the legislative

The court then expressly overruled any contrary precedent¹²⁸ and proceeded directly to take on the PTO's longstanding practice of ignoring 112(6), saying: "The fact that the PTO may have failed to adhere to a statutory mandate over an extended period of time does not justify its continuing to do so."¹²⁹

Turning to the merits, the court viewed Donaldson's claim language as covering, per 112(6), the flexible-walled collecting chamber and its equivalents. The prior art did not show such a feature or render it obvious; hence, the court reversed the PTO determination.¹³⁰

Two months later, the PTO expressly acquiesced to the court's holding and analysis of 112(6) in *Donaldson*. In a set of guidelines for examiners¹³¹ the PTO acknowledged the import of *Donaldson* for novelty and obviousness determinations, i.e., that the PTO must apply 112(6) in reaching such determinations if means-plus-function claim language is involved.¹³² It directed Examiners to follow the new guidelines "effective immediately."¹³³

The PTO has aligned its guidelines with the court's holding. This indicates that the battle over 112(6) seems to be over, at least on this point.

history of various revisions to Section 112 after its original passage in 1952, and concluded there was no evidence that Congress intended to ratify the PTO's practice of ignoring 112(6) in its various determinations of patentability. *Id.* at 1193 n.3.

128. *Id.* at 1193-94.

129. *Id.* at 1194. The court also took issue with the PTO's contention in this case that the court's precedents on 112(6) were in conflict with the ancient patent-law doctrine that claims should be interpreted as broadly as their language will reasonably permit. The court asserted that its decisions had interpreted claims this way, because in light of the statutory constraint of 112(6) it could not *reasonably* be urged that means-plus-function claim language was unlimited by the structures shown in the application's disclosure. *Id.* at 1194-95.

130. *Id.* at 1195-97.

131. Van Horn, *supra* note 103 at 571.

132. *Id.* at 571.

133. *Id.* In these guidelines, issued by the very agency (PTO) which so long resisted involvement with 112(6), there appears the clearest and most succinct articulation of 112(6) and how it differs from the equitable doctrine of equivalents:

An "equivalent" for the purpose of § 112, 6th paragraph, should not be confused with the doctrine of equivalents. . . . Section 112, 6th paragraph limits the scope of the broad "means or steps" limitations in a claim to a combination, to the structures, materials and acts described in the specification and equivalents thereof. The doctrine of equivalents equitably expands exclusive patent rights beyond the literal scope of a claim.

Id. at 574 (citing *Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039 (Fed. Cir. 1993)). The PTO's phrasing of the difference between these two concepts is elegant.

V. IMPACT OF 112(6) IN NARROWING CLAIMS FOR INFRINGEMENT ANALYSIS

Application of 112(6) to infringement analysis is probably the most important commercial aspect of that statutory provision. Early Federal Circuit decisions, beginning with *D.M.I., Inc. v. Deere & Co.*,¹³⁴ stressed that a means-plus-function expression was not limited, for infringement purposes, to the exact arrangement shown in the specification. The court in *D.M.I.* said: "To interpret 'means-plus-function' limitations as limited to a particular means set forth in the specification would be to nullify the provision of Sec. 112 requiring that the limitation shall be construed to cover the structure described in the specification and equivalents thereof."¹³⁵

This was enough to dispose of the issue then before the court, where the district judge had improperly limited the scope of the clause to only the structure disclosed in the specification. However, the court went on with a statement which wrongly hinted that the clause would cover all means for accomplishing the function: "Patentees are required to disclose in the specification some enabling means for accomplishing the function set forth in the 'means-plus-function' limitation. At the same time, there is and can be no requirement that applicants describe or predict every possible means of accomplishing that function."¹³⁶ The implication is that the patentee will nonetheless get coverage for every such possible means. In any event, there is nothing in the court's language to suggest that a "means" expression would not cover all means.

This potentially misleading dictum of *D.M.I.* was repeated by other early decisions in the Federal Circuit's development of the law regarding means-plus-function claims.¹³⁷ A case was needed where the facts would allow the court to state squarely that the permissive part of 112(6) does not mean that a functional recitation in a claim will be allowed to cover any and all means for carrying out the recited function. *Texas Instruments*¹³⁸ was such a case.

134. 755 F.2d 1570 (Fed. Cir. 1985).

135. *Id.* at 1574.

136. *Id.*

137. See, e.g., *P.M. Palumbo v. Don-Joy Co.*, 762 F.2d 969, 974 (Fed. Cir. 1985); *King Instruments Corp. v. Otari Corp.*, 767 F.2d 853, 862 (Fed. Cir. 1985), cert. denied, 475 U.S. 1016 (1986).

138. *Texas Instruments v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1562-63

A. The First Signal

Texas Instruments is the first Federal Circuit case to apply the second clause of 112(6) to take away some of what the first clause gives. In that case, the court found that the claim did not cover any and all means for carrying out its recited function. The rationale behind the decision will now be explored.

The case involved an International Trade Commission ("ITC") proceeding¹³⁹ to prohibit the importation of hand-held calculators, which Texas Instruments ("TI") said infringed its famous Kilby patent on calculators. The Kilby patent enjoyed an effective filing date of 1967, and the Federal Circuit found that it was a "pioneer patent."¹⁴⁰

The patent claim in issue was to a miniature, battery-powered calculator, and was defined in means-plus-function terms, viz.: (1) input means including a keyboard having a single set of number keys; (2) electronic means for performing arithmetic on numbers entered by the keyboard, including integrated circuit memory means for storing the numbers, arithmetic means for doing arithmetic on them, and means for transferring the numbers from the memory through the arithmetic means and back again; and (3) means for providing a visual display of the answer. The claim recited that all of these "means" were contained in a pocket-sized housing.¹⁴¹

In style this was undoubtedly the quintessential means-for claim. However, by the early 1980s, the technology for performing every one of the "means" functions had changed dramatically. For example, the preferred embodiment of the "display" shown in the patent was a thermal printer that used heat to print dots in the form of numerals on a paper tape. The allegedly infringing calculators used the more modern—and very different—liquid crystal display ("LCD").¹⁴²

The administrative law judge of the ITC found that each of the recited functions was carried out in the accused calculators. Nevertheless, the judge did not find infringement because the functions were carried out in radically different ways due to the advanced electronics available at the

(Fed. Cir. 1986).

139. Tariff Act of 1930 § 337, 19 U.S.C. § 1337, empowers the ITC to issue exclusion orders barring the importation of goods which infringe U.S. patents. Appeal of the ITC's decision in such a case is made to the Federal Circuit. *Id.*

140. *Texas Instruments*, 805 F.2d at 1561.

141. *Id.*

142. *Id.* at 1567.

later time the accused products were designed. Hence, the structures used in the imported calculators were not "equivalent" to the various structures shown in the TI specification.¹⁴³ The Federal Circuit agreed with the administrative law judge that the recited functions were all carried out to the letter in the accused products¹⁴⁴ and also agreed that there was no infringement. The court found that while the administrative law judge may have held TI a bit too closely to its specification,¹⁴⁵ the totality of the changes in structure seen in the imported calculators were simply too much to permit a finding of equivalency.¹⁴⁶

Texas Instruments was the beginning of a line of cases which hammered home two concepts: (1) that for infringement, means-plus-function expressions do not cover all means of performing the function; and (2) the last clause of 112(6) can operate to preclude infringement even when the recited functions are performed to the letter in the accused product. The next decision in this line of cases came down the following year and elaborated further on the role of 112(6) on this point.

B. 112(6) "Acts as a Restriction" in Infringement Analysis

In late 1987, a year after *Texas Instruments*, the Federal Circuit decided *Pennwalt Corp. v. Durand-Wayland, Inc.*¹⁴⁷ The case involved an apparatus for sorting fruit by weight, color, or both. The Federal Circuit affirmed a ruling of noninfringement, finding neither literal infringement nor infringement under the equitable doctrine of equivalents.¹⁴⁸ This *en banc* decision sought to refocus infringement analysis under the equitable doctrine of equivalents, to base it on an element-by-element approach instead of an invention-as-a-whole approach.¹⁴⁹ The

143. *Id.* at 1568.

144. The court stated: "TI correctly states, and the [administrative law judge] so found, that every function described in the [TI] patent claims is performed by the accused calculators." *Id.*

145. *Id.* (citing *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570 (Fed. Cir. 1985)).

146. *Id.* at 1568-70.

147. 833 F.2d 931 (Fed. Cir. 1987), *cert. denied*, 485 U.S. 961 (1988).

148. *Id.* at 939.

149. The groundwork for this shift had been laid in *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528 (Fed. Cir. 1987). The *en banc* rehearing of *Pennwalt* was possibly motivated by a desire within the court to harmonize its panel decisions on the issue of whether the doctrine of equivalents should be applied on an element-by-element basis or an invention-as-a-whole basis.

On the issues involving the doctrine of equivalents, the element-by-element approach was favored by the majority, which consisted of Chief Judge Markey and Circuit Judges Bissell

case is instructive on several points relating to means-plus-function limitations.

First the court took pains to distinguish 112(6) analyses from the equitable doctrine of equivalents. 112(6) signifies that the literal scope of a means-plus-function expression is not the total class of things which can perform the function, but the subclass of things consisting of the structures disclosed in the specification and their equivalents.¹⁵⁰ Whereas 112(6) applies only where the exact function recited in the claim is performed in the accused product, the equitable doctrine of equivalents may apply when the exact function recited is not performed by the accused product, but a similar function is.¹⁵¹

The court thereupon affirmed the district judge's rulings of noninfringement under 112(6) and under the doctrine of equivalents. On 112(6), the affirmance was based on the absence from the accused sorters of *any* kind of "position-indicating means" to locate a particular piece of fruit.¹⁵² Hence, 112(6) could not apply. On the doctrine of equivalents, the court found that no function similar to the position-indicating function

(author of the opinion), Friedman, Rich, Davis, Nies, and Archer, only three of whom (Rich, Nies, Archer) are in regular service on the court today. A vigorous dissent was filed by Senior Judge Bennett, and was joined by Senior Judge Cowen and Circuit Judges Smith and Newman. Of the dissenters only Judge Newman is in regular service on the court today. Judges Nies and Newman each filed a separate opinion in *Pennwalt* as well, stating their views favoring element-by-element comparison and invention-as-a-whole comparison, respectively.

The dissent did not challenge the majority regarding the interpretation of 112(6). It did, however, contend that the majority, in its application of law to the facts, had blurred the line between 112(6) and the equitable doctrine of equivalents. *Pennwalt*, 833 F.2d at 942-43.

150. *Pennwalt*, 833 F.2d at 933-34. Thus, under 112(6) a special kind of equivalency analysis is used to ascertain the literal scope of the expression. In the court's words:

Thus, section 112, paragraph 6, rules out the possibility that any and every means which performs the function specified in the claim *literally* satisfies that limitation. While encompassing equivalents of those disclosed in the specification, the provision, nevertheless, acts as a restriction on the literal satisfaction of a claim limitation.

Id. at 934.

151. The court, in distinguishing the two concepts, said:

If the required function is not performed *exactly* in the accused device, it must be borne in mind that section 112, paragraph 6, equivalency is not involved. Section 112, paragraph 6, plays no role in determining whether an equivalent function is performed by the accused device under the doctrine of equivalents.

Id.

152. *Id.* at 939.

was present in the accused sorters.¹⁵³ Hence, the equitable doctrine did not apply either. There was simply no infringement.

After the significant elaboration of 112(6) in *Pennwalt*, a case was needed in which the court could make a general statement on how the restrictive language of 112(6) was to apply.

C. A Generalized "Proper Understanding" of 112(6)

*Johnston v. IVAC Corp.*¹⁵⁴ involved medical thermometers, each consisting of a probe, a handle, and disposable covers for the probe. The invention as claimed had to do with firmly affixing the cover to the probe by use of a sharp edge on the periphery of the probe near where it joined the handle. The 112(6) dispute centered on the phrase: "means for inserting [the probe into the cover and for] forcing said probe cover to deform over said [probe] and causing said sharp edge to inscribe itself fixedly into said probe cover."¹⁵⁵

The district court granted summary judgment of noninfringement on the ground that the insertion means in the accused structure did not involve a sharp edge, but rather a retaining ring. The defendant's probes were deliberately machined so as not to have any sharp edges, and relied on a friction fit instead of a cutting fit.¹⁵⁶ However, the patentee's evidence showed microscopic scratches on the inside of the defendant's covers, and the patentee said this raised a triable issue as to the "sharp edge" limitation.

The Federal Circuit held that the claim phrase "to inscribe itself" was, properly interpreted, not literally met. In reaching that conclusion, the court made the following important observation about means-plus-function limitations in claims: "An element of a claim described as a means for performing a function, if read literally, would encompass any means for performing the function. But section 112 (6) operates to cut back on the type of means which could literally satisfy the claim language."¹⁵⁷

The *Johnston* court then amplified the role of 112(6): "Properly

153. *Id.*

154. 885 F.2d 1574 (Fed. Cir. 1989).

155. *Id.* at 1578 (emphasis omitted).

156. *Id.*

157. *Id.* at 1580 (emphasis added) (citing *Pennwalt* and *Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1201 (Fed. Cir. 1987)). Neither *Pennwalt* nor *Data Line* used this "cutting back" language, but arguably that was the sense of both cases. *Johnston* is important for bringing out this meaning expressly.

understood section 112 para. 6 operates more like the reverse doctrine of equivalents than the doctrine of equivalents because it restricts the scope of the literal claim language."¹⁵⁸

This statement is the culmination of what had been developed in the law of means-plus-function claims up to that time. 112(6) does in fact work like the reverse doctrine of equivalents, which essentially says that broad claim language will not operate to convey claim coverage over structures far different from those shown in the patent's disclosure portion.¹⁵⁹ It "cuts back" on what would otherwise, by wording only, appear to be covered by the claim. The court's observation suggests a caveat to readers of the Supreme Court's dictum in *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*¹⁶⁰ that if there is literal reading of a claim on an accused structure, there is infringement "and that is the end of it."¹⁶¹ That statement of the Court was probably not meant to be taken universally, and it will not be so taken today.

The court in *Johnston* pointed out that 112(6) can never apply unless the exact recited function is present in the accused structure.¹⁶² The court concluded that the inscription-fit function recited in the patentee's claims was not present in the defendant's product, which used friction fitting instead; hence, there was no infringement.¹⁶³

The insightful view of 112(6) expressed in *Johnston* has been cited and followed in later cases, notably *Jonsson v. Stanley Works*¹⁶⁴ and *Laitram Corp. v. Rexnord, Inc.*¹⁶⁵ *Jonsson* held that the scope of 112(6) equivalents to which the specification's structure was entitled was restricted by virtue of an argument presented to the PTO in order to secure allowance of the claim over the prior art.¹⁶⁶ *Laitram*, following as it did in the wake

158. *Johnston*, 885 F.2d at 1580.

159. See, e.g., *Westinghouse Elec. Corp. v. Boyden Power-Brake Co.*, 170 U.S. 537 (1898). For a discussion of the doctrine of reverse equivalents in modern patent law, see 4 Donald S. Chisum, *Patents (MB)* § 18.04[4] (Nov. 1994). Charles F. Pigott, Jr., *Equivalents In Reverse*, 48 J. PAT. OFF. SOC'Y. 291 (1966).

160. 339 U.S. 605 (1950).

161. *Id.* at 607.

162. *Johnston*, 885 F.2d at 1580. If the exact recited function is not present, the analysis immediately turns to the equitable doctrine of equivalents. *Id.*

163. *Id.* at 1580-81. The court also found no equivalency under the doctrine of equivalents, and hence affirmed the summary judgment of noninfringement. *Id.* at 1581.

164. 903 F.2d 812, 819 (Fed. Cir. 1990).

165. 939 F.2d 1533, 1536 (Fed. Cir. 1991).

166. *Jonsson*, 903 F.2d at 816. The patent applicant had argued that the word "diffuse," to describe light in a claim to a personnel-identification system for opening doors, meant light from multiple sources. The accused system used only one source, and thus was held noninfringing. *Id.*

of the generalized understanding of 112(6) revealed in *Johnston*, involved a large number of ancillary 112(6) propositions which must now be discussed in some detail.

D. The Ancillary Issues

Laitram shed light on several issues, none of which had been expressly dealt with in earlier cases. First, the court held that a patentee has the burden of proof in showing infringement of a 112(6) expression. To meet this burden a patentee must show more than that the accused infringing device performed the same function. The court also held that the inclusion of some structural language within an otherwise functional phrase in a claim cannot avoid the limiting impact of 112(6). Furthermore, the court made clear that the restrictive impact of 112(6) cannot be avoided by interpreting the claim in light of other (presumably broader) claims in the patent.

Laitram involved a conveyor-belt design that prevented the tipping of articles on the belt. The district court had found infringement, but the Federal Circuit reversed. The geometry of the individual links in the belt, and particularly the way they were joined together, was at issue in *Laitram*. The claim limitation in dispute recited a "means for joining" the links together in a certain described way, which included a recitation of such physical parameters as the ratio of length to width. The claim clause in question recited that holes in certain of the link members were coaxial with holes in other link members, and that sets of links had their hole axes parallel to other sets' hole axes.

The district court had treated the recitation as structural rather than functional and had therefore not applied the analysis of 112(6). The Federal Circuit found this to be error.¹⁶⁷ According to the court: "The recitation of some structure in a means plus function element does not preclude the applicability of section 112(6). For example, in this case, the structural description in the joining means clause merely serves to further specify the function of that means."¹⁶⁸

The suggestion here is that recital of some structure in a means-for clause—a common practice of many practitioners—will not avoid the narrowing, or "cutting back," effect of 112(6).

167. *Laitram*, 939 F.2d at 1535-36.

168. *Id.* at 1536.

The court next reiterated *Pennwalt's* concise explanation of how 112(6) works:

[Section 112(6)] means exactly what it says: To determine whether a claim limitation is met literally, where expressed as a means for performing a stated function, the court must compare the accused structure with the disclosed structure, and must find equivalent structure as well as identity of claimed function for that structure.¹⁶⁹

The court said it was an error of law for the district judge to have held that a claim limitation in means-for format was met “merely because there was some means in the accused device that performed that function The patentee must prove, for literal infringement, that the means in the accused device is structurally equivalent to the means described in the specification.”¹⁷⁰

The court then went on to deal with an argument by the patentee based on the doctrine of “claim differentiation.”¹⁷¹ Laitram, the patentee, sought to persuade the court that inasmuch as the patent also contained a claim dependent from the claim-in-suit, and the dependent claim recited the *structure* shown in the specification, the independent claim-in-suit must cover something more. This traditional claim-interpretation approach was rejected by the court on the ground that when applied to a means-plus-function claim, the approach would run counter to the Congressional command in 112(6) to constrain the construction of “means” expressions to the specification structures and their equiva-

169. *Id.* (quoting from *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 9:1, 934 (Fed. Cir. 1987), *cert. denied*, 485 U.S. 961 (1988)).

170. *Id.*

171. This doctrine of patent law says that in interpreting one claim of a patent it is often helpful to look at a claim which “depends from” the first claim. For example, a claim might read: “1. A process for treating biological material, comprising the steps of” Suppose there is in the patent a dependent claim, i.e., one that refers back to the first claim and is thus deemed by law to contain all of the first claim’s words (35 U.S.C. § 112, para. 4 (1988)) plus some new features: “2. The process of claim 1, wherein said biological material is human biological material.” According to the doctrine of claim differentiation, in interpreting the scope of claim 1, a court looks at claim 2. The court notes that claim 2 narrows claim 1 by restricting the biological material to “human” biological material. This aids the judge in determining that claim 1 is *not* limited to human biological material, else the two claims would present a redundancy. Therefore, the court concludes that claim 1 embraces some non-human biological materials. For a further exposition of this doctrine and cases that have applied it, see 4 Donald S. Chisum, *Patents (MB)* § 18.03[6] (Nov. 1994).

lents.¹⁷²

Finally, in holding that the claim before it was not infringed under the equitable doctrine of equivalents, the court gave some comfort to patentees by commenting: "This inquiry of equivalency to the joining means under the doctrine [of equivalents] may not be as limited as under section 112(6)."¹⁷³

The court seems to have left open the question of what happens *after* 112(6) is properly applied in claim interpretation. The suggestion is that the doctrine may be available to a patentee in the right circumstances, either to go outside the recited function or to go somehow outside the range of specification equivalents afforded by 112(6). In either case, the starting point for applying the equitable doctrine will have to be the cut-back scope resulting from application of 112(6).

VI. FUNCTIONAL TERMINOLOGY OTHER THAN "MEANS FOR" EXPRESSIONS

It is not known whether the jurisprudence now developed with respect to "means for" expressions will apply to other, equally functional, expressions. Many modern technical words define things by the functions they perform.¹⁷⁴ For example, in mechanics, a "drill" or a "screwdriver"; in electronics, an "amplifier" or an "AND gate"; in chemistry, a "reducing agent" or a "catalyst." Will these functional expressions likewise fall under the limiting effect of 112(6)?

One case has indicated that the precise language "means for" need not be present to trigger the narrowing effect of 112(6). *Fairchild Semiconductor Corp. v. Nintendo Co.*¹⁷⁵ involved the claim language "locking

172. *Laitram*, 939 F.2d at 1538.

173. *Id.* at 1539.

174. Judge Lourie has suggested a contrary view, i.e., that claim language normally defines things by what they are, rather than what they do. In *Int'l Visual Corp. v. Crown Metal Mfg. Co.*, 991 F.2d 768 (Fed. Cir. 1993), he said in a concurring opinion:

The tripartite tests often examine only what a device does, rather than what it is. Claims to machines, articles of manufacture, and compositions of matter generally define inventions by what they are, i.e., structurally. Thus, products may meet the tripartite tests in terms of what they do but be significantly different in terms of what they are.

Id. at 775.

175. 20 U.S.P.Q.2d (BNA) 1657 (W.D. Wash. 1994).

means having a detent,"¹⁷⁶ in connection with home video game equipment. After voicing the proposition that means-plus-function expressions describe what a thing does, whereas a structural element describes what it "is,"¹⁷⁷ the court went on to find that a "locking means" was functional because it refers to an object that locks something.¹⁷⁸ The extension was slight because at least the word "means" was present. One wonders whether the result would have been any different if the claim had simply said "lock." Such a term, like so many in science and technology, is functional notwithstanding the absence of "means for" wording.

Policy-wise, there seems to be no reason to treat these realistically functional terms any differently from the way we now treat claims phrased as "means for" carrying out a specified function, namely, as limited by the structures shown in the specification and drawings of the patent. But, on the other hand, such a reading would effectively nullify the concept of generic claiming, without which patents would be of far less commercial worth to their owners.

Interestingly, it is the PTO—so long resistant to 112(6)—which seems to be most forward-thinking about this 112(6) issue. The new guidelines for examiners,¹⁷⁹ described above, delve into the point in some detail. They list examples of claim language which would trigger 112(6), including "a jet driving device so constructed and located on the rotor as to drive the rotor."¹⁸⁰ The guidelines note that the use of the word "means" is unnecessary.¹⁸¹ On the other hand, the guidelines say some terms in claims, while using the word "means," do not fall within 112(6). For example, "plate means" or "wing means" are said to be non-functional because neither defines any function to be performed *per se*.¹⁸²

The guidelines also describe how to apply 112(6) to various result-oriented method steps.¹⁸³ In fact, 112(6) might apply to limit the

176. A detent is typically a small ball that is fixed to one part and spring-biased into a recess or groove in another part, to prevent relative motion between the two parts until a force is applied sufficient to overcome the spring bias and push the ball out of the recess or groove. The ball thus "detains" the second part from moving.

177. *Fairchild*, 30 U.S.P.Q.2d (BNA) at 1657 ("A means plus function element is written to describe what an element of the invention does. A structural element refers to what the element is.") .

178. *Id.*

179. See Van Horn, *supra* note 103..

180. *Id.* at 571.

181. *Id.*

182. *Id.*

183. *Id.* A method or process is claimed by reciting a novel sequence of steps, e.g., mixing X and Y; heating the mixture to form a viscous mass; and extruding the mass into

seemingly broad reach of many step recitations. Suppose, for example, that a claim recited: "heating said mixture to form a slurry," without saying how this is done, where the specification says the heating should be at 200 to 400 degrees Celsius for about three hours. Would someone infringe who forms a slurry by heating in a very different range? Perhaps some indication may appear in forthcoming cases regarding the extent to which 112(6) can apply to method claims.¹⁸⁴ It may well turn out that method claims are not infringed by competitors' processes which appear to meet the literal words of a result-oriented step in the claims, but which are performed in a dissimilar way from that disclosed in the specification. Such a result may be desirable, to move away from what some see as too broad of scope for modern generic patent claims. However, it may prove difficult to isolate which steps in a method claim are sufficiently broadly recited to trigger the restriction of 112(6).

CONCLUSIONS

A. *Would Walker Have Won Today?*

The above exploration has shown how the provisions of Section 112, paragraph 6, arose in the 1952 Congressional response to the 1946 *Halliburton v. Walker* case, and that the modern cases have applied it essentially as Mr. Walker wanted the prior case law to be applied by the Supreme Court. Would it have changed the result in *Halliburton*?

The question is a close one. The Supreme Court could today no longer invalidate Walker's claim on the basis that means-plus-function language is indefinite. But what would the claim's coverage be in Walker's infringement action against Halliburton? Walker's claim¹⁸⁵ would first of all reach his specifically disclosed acoustic tuning pipe—a structure Halliburton did not use. Pursuant to 112(6) it would also reach "equivalents thereof," but it is unclear whether that includes Halliburton's electrical filter. True, the filter was used for the same end result as the acoustic tuning pipe: to accentuate echoes from the tubing collars so that they could be accurately counted in calculating how far down in the well the surface of the oil was. However, it is debatable whether Halliburton's

a continuous band.

184. There is no doubt that the statute contemplates such applicability. See *supra* note 14.

185. For the claim language in issue, see *supra* note 35 and accompanying text.

filter worked in "substantially the same way" as Walker's tuning pipe.¹⁸⁶ Walker's tuning pipe worked to accentuate the desired echoes by creating standing sound waves of a certain frequency in the pipe. Halliburton's filter, by contrast, took as its input the electrical analogs of all the sounds coming from the well, and then electrically passed only those that had the desired frequency. The "substantially the same way" issue could be decided either for Halliburton or for Walker, depending on the court's perception of the degree of similarity of mode of operation.

B. Where is the Patent and Trademark Office Now Headed?

The PTO for a time did not agree with the Federal Circuit's view that 112(6) constrains the effective scope of means-for claims during PTO examination, either on statutory subject matter issues of Section 101 or on prior art issues of Sections 102 and 103. The conflict was worked out on the prior art front, but the PTO's position on statutory subject matter after *Alappat* remains unknown.

It is predicted that the Commissioner will acquiesce to *Alappat* on construing claims to determine statutory subject matter as he did to *Donaldson* on construing claims to determine obviousness. Any other result would lead to confusion in the examination process, which logically must begin with an assessment of just what the patent applicant is seeking by way of a patent grant. It would be anomalous to say that the same claim has two different scopes, one for judging obviousness and one for judging whether the claim embraces any nonstatutory subject matter.

C. Where is the Law Headed on Infringement?

The last clause of 112(6) has been uniformly applied in recent years to constrict the literal coverage of means-for expressions in infringement cases.¹⁸⁷ It is now established law that in infringement analysis the legal

186. See *supra* note 16 for the proposition that equivalency between two structures requires, *inter alia*, that they operate in substantially the same way.

187. Two recent nonprecedential Federal Circuit decisions have applied 112(6) to conclude that infringement requires not only the function recited, but the use of structures equivalent to those shown in the specification. See *Baltimore Therapeutic Equip. Co. v. Loredan Biomedical, Inc.*, 30 U.S.P.Q.2d (BNA) 1672, 1674, 1676-77 (Fed. Cir. 1994) (finding no infringement where claim recited "rotation registering means" and "brake means" plus their respective functions; and accused device operated differently from the structure disclosed in the patent); *Rain Bird Sprinkler Mfg. Corp. v. Toro Co.*, No. 93-1493, 1994 WL 224167, at *1-2 (Fed. Cir. May 23, 1994) (affirming judgment of noninfringement where accused

reach of such expressions is limited to the specific structures shown in the disclosure portion of the patent, plus the equivalents of those specific structures. Is there a reason to treat other claim expressions differently?

There is not. Generic coverage is a commercial necessity in a practical patent system, because virtually any narrowly worded claim may be avoided by a competitor. However, the courts must realize that many words commonly thought of as denoting "structure" are really just as "functional" as a means-for expression, and should be treated the same way in determining patent scope. Objects like screwdrivers, adder circuits, and catalysts are known and identified by what they do. Patent claims using such words should accordingly have the same reach as a corresponding "means for" expression would have. In an age where technical language seems more and more to be defined in functional terms in science and industry, it seems idle to insist that a philosophical notion of what things "are" should control the scope accorded to important commercial rights. Recourse to the specifics of a patent's disclosure seems the right approach in all cases.