

Easy Fix for U.S. Software Patent Problems: Comparative Law Perspective

Toshiko Takenaka, Professor of Law

University of Washington School of Law

Abstract

The leading literatures (Mark Lemley, *Software Patents and the Return of Functional Claiming*; Colleen Chien, *Patent Trolls by the Number*) point out activities of non-practicing entities and the overbroad scopes of software patents as major sources of negative impact on innovations and propose a reform. However, NPE's activities are rare outside the United States, although the number of software patents issued by JPO and EPO has substantially increased.

This paper compares the patent examination at USPTO, JPO and EPO regarding the software patents examined in the leading literatures. The study revealed that the majority of the examined software patents are issued only in U.S. Many of these patents were not filed at EPO or JPO. Those which were filed were either rejected or withdrawn at JPO and EPO. The scopes of European and Japanese patents were significantly narrowed compared with corresponding U.S. patents. At USPTO, the restrictive claim interpretation for functional claims under USC §112(f) made it easier to overcome eligibility, novelty, nonobviousness (inventive step), enablement, written description and claim definiteness rejections. In contrast, JPO and EPO adopt pre-*In re Donaldson* (16 F.3d 1189, Fed. Cir. 1994) claim interpretation to cover any structure, material, acts etc. to perform functions cited in the claim while courts adopt a restrictive claim interpretation for determining infringement of functional claims in light of the specification. This broad claim interpretation during the examination effectively prevents JPO and EPO from issuing overbroad software patents. Accordingly, this paper proposes overruling *In re Donaldson* and bringing USPTO examination for functional claims more in line with EPO and JPO. This harmonization also enhances examination collaboration among patent offices.

Table of Contents

Introduction

- I. Introduction
- II. Functional Claiming
 - a. United States
 - b. European Patent Convention
 - c. Japan
- III. Are the Problems with Software Patents Unique to United States?
 - a. NPE (Patent Trolls)
 - b. Patent Thickets
 - c. Ambiguous and Overbroad Scope
 - d. Invalid Patents
 - e. Proposed Reforms to Address the Problems
- IV. Comparison of Examination at USPTO, EPO and JPO
 - a. Overview
 - i. Claim Construction during Examination
 - ii. Eligibility
 - iii. Novelty & Nonobviousness (Inventive Step)
 - iv. Enablement
 - v. Written Description (Sufficient Support)
 - vi. Claim Definiteness
 - b. Case Studies
 - i. Example 1
 - ii. Example 2
 - iii. Example 3
- V. Claim Definiteness and Patent Eligibility
 - a. Lenient Requirement for Non Section 112(f) Functional Claims
 - b. Pre-*Allapat-State Street Bank* Practice
 - c. *In re Allapat; State Street Bank*
 - d. JPO Practice
 - e. EPO Practice
- VI. Broadest Reasonable Construction
 - a. In re Donaldson
 - b. Legislative History of Section 112(f)
 - c. *Warner-Jenkinson v. Hilton Davis*
 - d. Federal Circuit Case Law
- VII. Easy Fix
- VIII. Conclusion

I. Introduction

As the growth of software industry, the number of patents on software-related invention has been rapidly increasing in the United States. In addition to the absolute number of software patents, the ratio of those patents granted in the United States Patent and Trademark Office (USPTO) has also been rising.¹ U.S. commentators argue that software patents do more harm than good for promoting innovations and list up a number of problems caused by the numerous number of software patents issued by USPTO.² One of the most serious accusations of the harm is that the rapid increase of software patents caused the emergence of monsters called “patent trolls”, which attack companies by enforcing patent rights and attempt to obtain royalty revenue.³ According to the recent statistics, 62% of the patent litigations were brought by patent assertion entities (“patent trolls”) in 2012.⁴ Among all of the defendants sued by patent trolls from 2005 to 2012, 82% of them have been brought a lawsuit on the basis of a software patent.⁵ Therefore, patent trolls mainly use software patents as ammunition for attacking.

Some U.S. commentators blame the overbroad scope resulting from a claim drafting technique, functional claiming for the problems.⁶ The functional claiming is widely adopted by

¹ James Bessen & Robert M. Hunt, *An Empirical Look at Software Patents*, 16 J. Econ. & Mgmt. Strategy 157, 169 (2007).

² Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 Wis. L. Rev. 905, 928 (2013). [hereinafter, Lemley, *Functional Claiming*]; Kevin Emerson Collins, *Patent Law’s Functionality Malfunxion and Its Implications for the Problem of Overbroad, Functional Software Patents* 14–17 (Wash. Univ. Sch. of Law Legal Studies Research Paper Series, Paper No. 13-2-1, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2221950.

³ Allison et al., *Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents*, 158 U. PA. L. REV. 1 (2009).

⁴ Colleen V. Chien, *Patent Trolls by the Numbers*, Santa Clara Univ. Legal Studies Research Paper No. 08-13 (2013), <http://ssrn.com/abstract=2233041>. [hereinafter Chain, *Patent Trolls*]

⁵ Colleen V. Chien & Aashish R. Karkhanis, *Functional Claiming and Software Patents*, Santa Clara Univ. Legal Studies Research Paper No. 06-13 (2013), <http://ssrn.com/abstract=2215867>.

⁶ *Supra* note 2, Lemley, *Functional Claiming* at 928.

the software industry to define their inventions by functions, instead of physical features such as structures, materials and acts. Commentators argues that software patents are abstract and functional by nature, and therefore give patentees extremely broad scope of exclusive rights which even inventor never had in mind at the time of filing.⁷ The combination of a patent thicket including many invalidity patents and the uncertainty of such patents on functional claims made software companies as easy targets for patent trolls.⁸

However, aggressive litigations filed by patent trolls are unique phenomena in the United States. Software is patent eligible as long as it is tied to a machine and thus being implemented by a hardware resource such as a general purpose computer in Japan and European countries.⁹ The ratio of software-related patent applications filed to the Japan Patent Office (JPO) has been increasing.¹⁰ European Patent Office (EPO) and JPO issue software patents as many as patents issued by USPTO.¹¹ Both European Patent Convention (EPC) and Japanese Patent Act allow functional claiming and apply the enablement, written description and definiteness standards which are very slimier to corresponding requirements used by USPTO.¹² A major difference between USPTO and EPO-JPO is a claim construction: The scope of functional claim should include all variations which performs the function recited in the claim.¹³ This broad claim construction makes it easy for EPO-JPO to reject functional claims not only for lack of

⁷ *Id.*, at 930. CHRISTINA BOHANNAN & HERBERT HOVENKAMP, CREATION WITHOUT RESTRAINT: PROMOTING LIBERTY AND RIVALRY IN INNOVATION 125 (2012).

⁸ *Supra* note 2, Lemley, *Functional Claiming* at 934.

⁹ See *infra*

¹⁰ Chozaburo Minagawa, *Sofutouea Tokkyo wo Meguru Tokkyo Funso oyobi Nihon ni okeru Tokkyo Shutsugan Doukou [Patent Litigation and the Number of Patent Applications related to Software Patents in Japan]* (Jan. 31, 2013), <http://most.tus.ac.jp/mip/column/detail.php?i=587>.

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¹² See *infra*

¹³ See *infra*

enablement, written description and definiteness but also for lack of eligibility, novelty and inventive step.

Once a patent is issued, functional claims are interpreted in light of the specification by Japanese courts, and courts in EPC member states, particularly Germany. Such scope covers only the embodiments disclosed in the specification and equivalents which perform the function cited in the claim.¹⁴

This paper discusses functional claiming under US Patent Act, EPC and Japanese Patent Act and examine whether the problems with software patents and functional claiming are unique to the United States. It will compare the examination of functional claims at the USPTO, the EPO and the JPO by conducting case studies on patents examined in the literatures: the troll owned high power impact patents examined by Prof. Chien and overbroad functional claims examined by Prof. Lemley. The study revealed that many of these patents were not filed at the EPO or the JPO. Those which were filed were either rejected or withdrawn at the JPO and the EPO because of a broadest reasonable construction made it difficult to distinguish a functional claim from the prior art, have the full scope of such claim from being enabled or supported by the disclosure in the specification or have the claim definitely describing the invention. To overcome rejections on these grounds, functional claims were substantially amended which led to significantly narrower scopes of European and Japanese patents compared with corresponding U.S. patents.

USPTO had long adopted the same broadest reasonable construction for examining functional claims until in *In re Donaldson* the *en banc* Federal Circuit struck down the USPTO's practice and instructed to apply the narrow claim construction to cover only the embodiments

¹⁴ See *infra*

disclosed in the specification and their equivalents under 35 USC §112(f). This paper argues that *In re Donaldson* was wrongly decided and thus should be overruled because Donaldson is inconsistent with the Supreme Court's narrow interpretation of the impact for introducing 35 USC §112(f). Even if *In re Donaldson* is correctly decided, the current claim construction rule is too narrow and thus inconsistent with the rule provided in 35 USC §112(f). With the proper construction to include equivalents of the disclosed embodiments, USPTO can effectively eliminate ambiguous and overbroad functional claims.

II. Functional Claiming

a. United States

The current U.S. Patent System follows the peripheral definition theory in which the claim language defines the boundary of exclusive patent rights. To make the boundary clear, U.S. patent applicants are required to distinctively claim the subject matter which the inventor regards as the invention or a joint inventor regards as the invention.¹⁵ To meet this requirement, the general rule is that the subject matter must be defined by physical features such as the structure, material and acts of the subject matter.¹⁶

However, the claim drafting practice to define the invention by function is once widely adopted in the United States because the U.S. patent system followed the central definition theory until the mid-19th century.¹⁷ Under the central definition theory, the claim language defines an example of the invention from which courts can expand the boundary of exclusive rights. Early U.S. patent statutes did not impose any duty to include a claim. Early patent

¹⁵ 35 U.S.C. §112(b). For more discussion of the claim definiteness, see Part II, A.2. f).

¹⁶ 35 U.S.C. §112(f) provides an exception to this general rule.

¹⁷ Toshiko Takenaka, *Interpreting Patent Claims: The United States, Germany and Japan*, 17 IIC Studies, 6-12 [Hereinafter "Takenaka, Interpreting Patent Claims"] (1995).

statutes did not provide any duty for inventors to specify their inventions. Only after the Supreme Court acknowledged the duty in *Evans v. Eaton* (1822)¹⁸ did Congress codify a requirement to include a claim in the Patent Act of 1836.¹⁹ Before the Supreme Court decision, the patent community developed a practice to include a statement specifying the part or improvement of a device or process to claim as his invention. Such a statement included terms such as “substantially as herein described” or “substantially as set forth” to extend protection to insubstantial modifications as equivalents of the embodiments disclosed in the specification and drawings.²⁰ Another technique to capture variations of the embodiments described in the specification is a functional claiming practice to define inventions by functions instead of the physical characteristics.²¹ A shift from the central to the peripheral definition theory began with the enactment of the 1870 Patent Act²² and the Court’s emphasis on the significance of the claim to define the extent of patent protection.²³ As a result, the central definition claim drafting practice with terms such as “substantially as described” was on its way out by the late 19th century.

The shift to the peripheral definition theory led to the Supreme Court’s disapproval of a claim drafting practice in which an important element of the claimed invention is described by functional limitations as being ambiguous and overly broad. In *Halliburton* (1946)²⁴ the Supreme Court struck found claims invalid when the asserted claims define the most crucial novel element of the invention by a function instead of physical features because the public and

¹⁸ *Evans v. Eaton*, 20 U.S. 356, 7 Wheat. 356, 5 L. Ed. 472 (1822)

¹⁹ Act of July 4, 1836, ch. 357, §6, 5 Stat. 117.

²⁰ *Ex parte Fressola*, 27 U.S.P.Q.2d 1608 (Bd. Pat. App. & Interferences 1993)

²¹ *Supra* note 2, Lemley, *Functional Claiming* at 914.

²² Act of July 8, 1870, ch. 230, §26, 16 Stat. 198. Deller, Patent Claims, §1 (2nd ed. 1971), Warren Jessup, *The Doctrine of Equivalents*, 54 JPTOS 248 (1972).

²³ *Merrill v. Yeomans*, 94 U.S. 568, 4 Otto 568, 24 L. Ed. 235 (1877)

²⁴ *General Electric Co. v. Wabash Appliance Co.*, 304 U.S. 364, 37 USPQ 466 (1938); *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 71 USPQ 1 (1946).

those affected by the patent. For endorsing the established practice of defining an invention by functions when the invention includes multiple elements, Congress introduced §112(f) in the 1952 Act and made clear that an element of the invention can be described as a means or step for performing a function while the scope of such element covers only the physical features of the embodiments disclosed in the specification and their equivalents.²⁵

It was not clear whether the narrow claim construction applies both in litigation and examination until the en banc Federal Circuit instructed the USPTO to apply the narrow claim construction to reject claims in *In re Donaldson*.²⁶ Despite of the introduction of §112(f), the USPTO continued to refuse apply the narrow claim construction for rejecting claims because it applies the broadest reasonable construction to cover any elements to perform the function cited in the claim during the prosecution.²⁷ The USPTO adopts the broadest reasonable interpretation to serve the public interests by preventing applicants and patentees from obtaining a scope broader than justified while guaranteeing a chance to amend claims and obtain appropriate coverage with clear claim language.²⁸

In response to the instruction, the USPTO makes clear that the examiner should follow §112(f) and apply the broadest reasonable construction of functional claims, which results in the scope including the structure, materials or act described in the specification as performing the claim entire claimed function.²⁹ It is often difficult to distinguish a function from a structure because many devices, such as computers, conductors, sensors and filters, are named after their function. The claim terms reciting such names should be considered as defining an element by a

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²⁶ *In re Donaldson Company, Inc.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994) (en banc).

²⁷ *Burlington Industries, Inc. v. Quigg*, 822 F.2d 1581, 1583, 3 USPQ2d 1436, 1438 (Fed. Cir. 1987).

²⁸ *In re Bigio*, 381 F.3d 1320, 1324, 72 USPQ2d 1209 (Fed. Cir. 2004),

²⁹ USPTO, Manual of Patent Examining Procedure [hereinafter, MPEP] §2181 (9th ed, 2014)

structure if the terms have a reasonably well understood meaning in the art.³⁰ It is even more difficult to distinguish a function from an act because acts in method claims are directed at obtaining a particular result through a function. The Federal Circuit applies a reasonably well understood meaning in the art to find an act instead of a function.³¹ To determine if claim terms define an element by a function, the Federal Circuit developed an analytical framework.³² Under this framework, the burden to show that the claim terms define an element by a function shifts between the patentee and accused infringer whether the terms include the word “means” in combination with an element which defines a function. If the terms include the word “means,” the element is presumed to be drafted in the means-plus-function format. The patentee can overcome this presumption by showing that the claim terms recite sufficient structure, material and acts for performing the function recited in the claim terms. Even if the claim terms do not include the word “means” and thus the presumption does not apply, the exception applies to construe the terms if it is apparent that the terms define an element by a function without any additional recital of specific structure, material or act for performing the function.

The USPTO instructs the examiners to use this framework to determine whether a claim element invokes the narrow claim construction under §112(f): “[t]he claim limitation is presumed to invoke 35 U.S.C.112(f) ... when it explicitly uses the term “means” or “step” and includes functional language.”³³ However, the USPTO expanded the applicability of presumption in applying the narrow construction when a claim element uses the term which is a substitute for “means” that is a generic placeholder for performing the claimed function, it is also

³⁰ *Greenberg v. Ethicon Endo-Surgery*, 91 F.3d 1580, 39 U.S.P.Q.2d 1783 (Fed. Cir. 1996).

³¹ *Caterpillar Inc. v. Detroit Diesel Corp.* 961 F. Supp. 1249, 41 USPQ2d 1876 (N.D. Ind. 1996), *aff'd*, 194 F.3d 1336 (Fed. Cir. 1999) (unpublished).

³² *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2d 1161 (Fed. Cir. 1999).

³³ *Id.*

presumed to invoke 35 U.S.C. §112 (f).³⁴ The MPEP shows the examples of the generic placeholder, such as “mechanism for”, “module for”, “device for”, “unit for”, “component for”, “element for”, “member for”, “apparatus for”, “machine for” or “system for”.³⁵ This presumption can be overcome when the sufficient structure is recited in the claim.³⁶ This practice is inconsistent with the Federal Circuit case law in which courts are very reluctant to apply the presumption because failing to include the “means” term creates a strong presumption for not invoking the 112(f) narrow construction.³⁷ The Federal Circuit is also very reluctant to find a function if a step is not drafted in the step-plus-function format.³⁸

b. European Patent Convention

In Europe, Germany Patent System was known for its claim drafting practice for following the central definition theory in contrast the United Kingdom Patent System was known for its claim drafting practice following the peripheral definition theory.³⁹ EPC adopted a compromise position between the two extreme practices, requiring

c. Japan

III. Are the Problems with Software Patents and Functional Claiming Unique to United States?

a. Definition and Nature of Software Patents

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Apple Inc. v. Motorola, Inc.*, 2014 U.S. App. LEXIS 7757, 94 Fed. R. Evid. Serv. (Callaghan) 301, 110 U.S.P.Q.2D 1695 (Fed. Cir. Apr. 25, 2014)

³⁸ *Serrano v. Telular Corp.*, 111 F.3d 1578, 42 USPQ2d 1538 (Fed. Cir. 1997). However, during the examination, USPTO applies the §112(f) rule when a claim includes a non-structural generic placeholders such as “mechanism for,” “module for,” “device for,” “unit for,” “component for,” “element for,” “member for,” “apparatus for,” “machine for,” or “system for.” USPTO, Manual of Patent Examining Procedure (MPEP) (9ed, 2014) §2181 (<http://www.uspto.gov/web/offices/pac/mpep/s2181.html>).

³⁹ Takenaka

- b. NPE (Patent Trolls)
 - c. Patent Thickets
 - d. Ambiguous and Overbroad Scope
 - e. Invalid Patents
 - f. Proposed Reforms to Address the Problems
- IV. Comparison of Examination at USPTO, EPO and JPO
- a. Overview
 - i. Claim Construction during Examination
 - ii. Eligibility
 - iii. Novelty & Nonobviousness (Inventive Step)
 - iv. Enablement
 - v. Written Description (Sufficient Support)
 - vi. Claim Definiteness
 - b. Case Studies
 - i. Overview

In order to compare the examination practices concerning a computer software invention between the U.S., Europe and Japan, several examples are selected from the list of the high impact patents owned by patent trolls.⁴⁰ In addition to the high impact patents, several patents are also selected from those discussed in the Lemley's article.⁴¹

Thirty six U.S. patent applications are selected from high impact patents by patent trolls or software patents litigated in the U.S. Among the thirty six U.S. patent applications; there

⁴⁰ Chien, *Supra* note 2, at 7.

⁴¹ Lemley, *Supra* note 4.

are 11 corresponding Japanese patent applications. Especially, among the 15 U.S. patents owned by patent trolls, only 3 patent applications were also filed to Japan. On the other hand, there are 18 corresponding applications filed to EPO. Among the fifteen U.S. patents owned by patent trolls, five patent applications were also filed with the EPO. Table 1 lists U.S. patents which have Japanese or EPO's corresponding applications and their examination results.

US Patent	JP Patent	JP result	EP Patent	EP result
US 6,101,502	JP 2001-518670 A	Rejected	EP 1068577 A1	Withdrawn
US 5,884,270	JP 2002-513522 A	Abandoned	EP 0923825 A1	Withdrawn
US 6,029,154	JP 5265213 B2	Granted	EP 1340178 A2	Pending
	JP2004-524599 A	Rejected		
US 6,092,194	JP 3952315 B2	Granted	EP 0965094 B1	Granted
			EP 1810152 A2	Pending
US 4,975,952	JP 2746363 B2	Granted	EP 0213682 B1	Granted
US 4,763,356	JP H05-22253 B2	Granted	EP 0271280 B1	Granted
	JP H07-200172 A	Rejected		
US 6,714,859	JP2002-538448 A	Abandoned	EP 0966720 A1	Rejected
			EP 1261902 A1	Rejected
			EP 1264296 B1	Granted
US 6,275,821	JP H08-241336 A	Rejected	EP 0792491 B1	Granted
US 6,023,683	JP 4159621 B2	Granted	EP 0697669 B1	Granted
			EP 1182597 A2	Pending
US 7,017,111	N/A	N/A	EP 1275059 A1	Pending
			EP 2320373 A2	Pending
US 7,054,949	N/A	N/A	EP 1354458 A2	Withdrawn
			EP 1360838 A2	Withdrawn
US 7,346,472	N/A	N/A	EP 1172001 A1	Rejected

Table.1 list of patents which have corresponding Japanese or EPO's applications. (Bold type applications correspond to high impact patents by patent trolls)

Among the 11 corresponding Japanese patent applications, 2 of them are abandoned before examination, 5 of them are granted and 4 of them are rejected based on lack of inventive step (obviousness), lack of patent eligibility, lack of enablement, and/or indefiniteness. It is worth noting that none of the high impact patents listed in Chien's article are granted in Japan.

Among the 18 corresponding EPO's applications, 4 of them are withdrawn, 6 of them are granted, 3 of them are rejected and 5 of them are still in progress. 2 applications out of 5 high impact patents are also granted in the EPO.

The followings are three examples of examination results.

ii. Example 1: US 6,101,502

The invention is about object model mapping and runtime engine for employing relational database with object oriented software. Both Japanese and European applications were filed as an international application and thus began with claims with the same language during the international phase. The patent application was granted in the U.S., whereas the corresponding patent application was rejected in Japan.⁴² A corresponding European patent application was filed but withdrawn after a request of examination was filed.

⁴² Independent claim 1 and 10 of U.S. patent claims are as follows:

1. A method for interfacing an object oriented software application with a relational database, comprising the steps of:
selecting an object model;
generating a map of at least some relationships between schema in the database and the selected object model;
employing the map to create at least one interface object associated with an object corresponding to a class associated with the object oriented software application; and
utilizing a runtime engine which invokes said at least one interface object with the object oriented application to access data from the relational database.

Examination at the JPO

The U.S. patent application includes two groups of claims, one directed to a method and another directed to a computer program. The first office action was issued on November 10, 1999 after the publication of the 1999 Interim Supplemental Examination Guidelines for Determining the Applicability of 35 U.S.C. §112¶6 in September.⁴³ It is likely that the examiner interpreted the claims as not being means-plus or steps-plus-function claims because he neither cited §112(f) nor conducted the additional analysis for meeting the claim definiteness requirement under the Supplemental Guidelines. The U.S. patent examiner rejected all claims under 35 U.S.C. §102 (e) (Pre-AIA) as having been anticipated by a U.S. patent reference (Chang et al) without discussing the structures or acts disclosed in the specification in interpreting the method claims. His analysis is focused on the claim language. This anticipation rejection was overcome when the applicant amended the original claims to a structure, a runtime engine invoking an interface object to distinguish the Chang reference.

In addition, the examiner rejected the group of claims directing to a computer software claims for lack of patent eligibility under 35 U.S.C. §101 citing the 1996 Examination

10. A computer program fixed on a computer-readable medium and adapted to operate on a computer to provide access to a relational database for an object oriented software application, comprising:

a mapping routine that generates a map of at least some relationships between schema in the database and a selected object model;

a code generator that employs said map to create at least one interface object associated with an object corresponding to a class associated with the object oriented software application; and

a runtime engine that invokes said at least one interface object to access data from the relational database. (See US Patent No. 6,101,502, col.7-8.)

⁴³ 64 FR 41392.

Guidelines for Computer-Related Inventions.⁴⁴ Under the 1996 Guidelines, a claim directing o a computer program is not eligible unless the program is defined in terms of specific steps to be performed on a computer or using a computer. The examiners found steps listed in the computer program claims are routines and thus does not include any limitations to define the program by specific steps.

The eligibility rejection was also overcome when the applicant amended to introduce limitations to tie the program to a computer-readable medium and adopted to operate on a computer. This ‘502 Patent was examined the pre-*Bilski* software guidelines. Following the post-*Allapat-State Street Bank* case law, a patent claim is eligible if an examiner can identify and understand any practical application to produce a useful, concrete and tangible result from the specification. The applicant did not discuss any result produced by the computer program. In overcoming both grounds of rejection, the examiner allowed both groups of amended claims. The ‘502 patent was issued on August 8th 2000.

Examination at the JPO

At the JPO, applicant voluntarily amended the claims to have the same language as the claims issued at the USPTO before the examiner sent a first office action. The JPO examiner rejected the claims based on lack of definiteness, lack of inventive step and patent ineligibility. JP examiner considered that both groups of the claims were indefinite because the scope of the claims was too abstract and functional that the person skilled in the art could not specify the concrete structures of the claimed invention. This rejection was very similar to the USPTO examiner’s rejection of computer program claims for lack of eligibility, requiring a definition of specific steps for performing the function. If the claim is not a means-plus-function claim, none

⁴⁴ 61 Fed. Reg. 7478.

of the structures or concrete steps disclosed in the specification is imported into the claim. Nevertheless, the USPTO examiner allowed the claims once the claims are tied to a computer.

In contrast, the JPO examiner found the method claims only define a direction, instead of specific steps to provide a relational database for an object oriented software application. In particular, the examiner pointed out one skilled in the art would not understand the meaning of a claim term in one of method claims even if he interprets the terms in light of the specification. The unclear term is a translation of “creating” with respect to stateful interface object and stateless interface object. The applicant cancelled the computer program claims and amended the method claims to introduce additional limitations relating to details of mapping and steps from the specification.

However, the JPO examiner maintained his rejection finding the claims being indefinite. He found the written description of the specification did not include any specific steps for providing a relational database for an object oriented software application. The examiner found the claim terms “object oriented software application” unclear to one skilled in the art and not defined in the specification. Other terms in the method claims were also found unclear.

The JPO examiner rejected the method claims for lack of eligibility for failing to apply a law of nature because the claim was not directed to a data processing method being concretely implemented by hardware resources in a computer. He did not find a disclosure of all hardware resources to implement the steps included in the method claims. The applicant asserted that one of the claimed steps is implemented by the structures disclosed in one of drawings. The JPO examiner rejected this argument because such structures are not imported into the method claims unless the claims are amended to introduce limitations relating to the disclosed structures.

Both method and computer program claims were rejected for lack of inventive step over the two references, JPO 18 month publications. Neither of the publications was cited at the USPTO. The JPO examiner found that all limitations are disclosed or suggested by the two references. The applicant argued that the additional limitations added through the amendment were not disclosed in either reference. The examiner rejected the argument that the limitations were not explicitly disclosed in the specification.

Examination at the EPO

The corresponding patent application was also filed to EPO. However, the corresponding patent application was deemed to be withdrawn before the examination. Therefore, no substantial examination was performed in the EPO.

Analysis

There is a significant difference in applying the claim definiteness requirement between the USPTO and JPO examiners. The USPTO examiner focused on his examination on the eligibility ground instead of the claim definiteness or adequate disclosure requirements. The issued method claims include none of limitations relating to hardware resources for implementing the steps. Although the computer program claims include limitations for tying the software to a computer-readable medium and a computer, none of hardware resources within the computer is included in the computer program. Since the claims were not considered as step-plus-function claims, the examiner did not press the applicant to disclose structures, such as hardware resources and algorithms, to implement a highly abstract functional claim terms in the specification. Nevertheless, the lenient requirement of patent eligibility under the pre-Bilski case law and the USPTO examination guidelines let the examiner allowing both method and

computer program claims without importing any of limitations on structures from the specification into the claim.

This is a stark contrast to the examination at the JPO. The JPO examiner focused on the quality of disclosure in the written description of the specification and the limitations in the claim to define the scope of exclusivity. Because there is no distinction between the means-plus-function claims and claims in other formats under Japanese Patent Act, the examiner applied the same rigorous standard for software inventions regardless of the claim format and requires applicants to disclose hardware resources and concrete structures to implement the highly abstract functions recited in the claim. Claims are rejected for being indefinite unless the structure for implementing the function is not included in the claims. When the disclosure fails to disclose none of such structures, applicants were unable to introduce any structural limitation in to the claim. As a result, the applicant did not challenge the JPO examiner's rejection.

Moreover, when a claim is found indefinite for failing to include the structures to implement functions, it is likely that claims fail to meet patent eligibility. Japanese Patent Act defines the invention as a creation of technical ideas applying a law of nature.⁴⁵ IP High Court emphasizes the requirement of the application of a law of nature.⁴⁶ Regarding software inventions, the JPO interprets the requirement to uphold the eligibility only when the data processing by software is concretely implemented by using hardware resources.⁴⁷ The JPO finds that data processing is concretely implemented if downloading of software into a computer results in a specific use machine or operational method in which software and hardware resources collaborate to provide an arithmetic operation or manipulation of information for the

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⁴⁷ JPO Guidelines, Part VII, Chapter 1, 2.

specific use. For an idea to be qualified as being technical, the idea must be sufficiently concrete enough to accomplish a certain purpose and has a practical use.⁴⁸ In short, regardless of category of inventions or claim format, if claims do not define software inventions in terms of hardware resources which implement functions, they are not only indefinite but also not patent eligible.

The comparison of examinations at the JPO and USPTO reveals another problem: Access to non-English references. Two Japanese references are cited only at the JPO. Although the USPTO examiners have access to in-house translators if they find non-English references, it is unlikely for them to find a reference. Unlike chemical and mechanical inventions, it is difficult to understand software inventions only from the drawing without reading the texts. Japan has a matured software industry but Japanese firms do not translate all applications to file outside Japan. It is likely that many material references are not available at the USPTO due to the language problem.

Even if the two Japanese references were available at the USPTO, the USPTO examiner may not be able to use the references and reject claims if the claims are drafted in means or steps-plus-function format.

ii. Example 2: US 6,029,154(JP 2004-524599 A, JP 5265213 B2)

The invention is about method and system for detecting fraud in a credit card transaction over the internet. US patent contains three claims. Claim 1 and 3 are method claim and claim 2 is a system claim.⁴⁹

⁴⁸ Judgment of Tokyo High Court, May 26, 1999, Hei0 (Gyo ke) 206.

⁴⁹ Claim 2 of US patent is as follows:

Examination at the USPTO

In the first office action, examiner rejected all of the claims based upon a public use or sale of the invention under 35 U.S.C. §102 (b), and obviousness under 35 U.S.C. §103 (a) over three U.S. patents. After the first office action, applicant limited the scope of the claims and also added new claims.

In the final office action, the examiner rejected some of the claims based on the obviousness under 35 U.S.C. §103 (a), but found non-obvious for three claims. Therefore, the applicant cancelled the claims which were found obvious, and amended the claims based on the

2. A computer readable medium containing program instructions for detecting fraud in a credit card transaction between a consumer and a merchant over the Internet, wherein execution of the program instructions by one or more processors of a computer system causes the one or more processors to carry out the steps of:

a) obtaining credit card information relating to the transactions from the consumer; and

b) verifying the credit card information based upon values of a plurality of parameters, in combination with information that identifies the consumer, and that may provide an indication whether the credit card transaction is fraudulent,

wherein each value among the plurality of parameters is weighted in the verifying step according to an importance, as determined by the merchant, of that value to the credit card transaction, so as to provide the merchant with a quantifiable indication of whether the credit card transaction is fraudulent,

wherein execution of the program instructions by one or more processors of a computer system causes the one or more processors to carry out the further steps of;

obtaining other transactions utilizing an Internet address that is identified with the credit card transaction; constructing a map of credit card numbers based upon the other transactions; and

utilizing the map of credit card numbers to determine if the credit card transaction is valid.

(See U.S. Patent No. 6,029,154, col.4-5.)

three claims which were found non-obvious. As a result, the examiner granted the three claims, and the patent was issued on February 22th 2000.

Examination at the JPO

JPO rejected the corresponding patent application by lack of inventive step, lack of enablement, indefiniteness, and patent ineligibility. Regarding the definiteness requirement, JPO examiner judged that the claim was unclear what kind of data processing was executed by computer and what kind of hardware resources were used. In addition, with respect to the enablement, the examiner decided that the specification was not adequately described the invention, and therefore the person skilled in the art could not enable the concrete structures of the invention.

After the rejection of the original patent application, the applicant filed a divisional application. The divisional application was eventually granted by limiting the scope of the claimed invention. The scope of claimed invention granted in Japan was much narrower than that in the U.S.

Examination at the EPO

In the first office action, the examiner rejected the claim by non-patentable subject matter. The examiner mentioned that the claimed invention was merely a method for solving commercial problem which was excluded from patentability. The examiner also rejected the claims by lack of inventive step, because the claimed method of evaluating fraud risk associated with an electronic commerce transaction was a routine programming measure by the skilled person.

In response to the first office action, the applicant argued that the claimed invention comprised technical considerations and provided a solution to the technical problems, and therefore the claimed invention was a patentable subject matter.

This application is still pending in the EPO.

iii. Example 3: US 6,275,821(JP H08-241336 A)

The invention relates to a method for executing a guided parametric search. The patent application was granted in the U.S. and EPO, whereas the corresponding patent application was rejected in Japan.⁵⁰

⁵⁰ The independent claims granted by USPTO are as follows:

1. A method for assisting a user in identifying a subfamily of items within a family of items, comprising the steps of:
 - (a) providing a computer readable data file of stored information representing at least one family of items, said data file identifying at least one alternative for each item,
 - (b) reading said data file,
 - (c) displaying a feature screen indicating said alternatives represented in the family,
 - (d) accepting a first selection criteria of at least one alternative,
 - (e) determining a first subfamily of items wherein each said item in the first subfamily satisfies said first selection criteria,
 - (f) determining available alternatives represented in the first subfamily,
 - (g) revising said feature screen to indicate the available alternatives of the first subfamily,
 - (h) accepting a second selection criteria comprising the alternative or alternatives of the first selection criteria plus at least one alternative selected from the revised feature screen,
 - (i) determining a second subfamily of items of the family wherein each item in the second subfamily satisfies said second selection criteria,
 - (j) determining available alternatives represented in the second subfamily, and
 - (k) revising said feature screen to indicate the available alternatives of the second subfamily.
5. A method for assisting a user in identifying a subfamily of items within a family of items, comprising the steps of:
 - (a) providing a computer readable data file of stored information representing at least one family of items, said data file identifying at least one alternative for each item,
 - (b) reading said data file,
 - (c) displaying a feature screen indicating said alternatives represented in the family,

US Examination result

The number of original claims was 30, and the original claims contained both method and system claims. However, claims 2-30 were canceled by preliminary amendment before the first office action. Therefore, the remaining claim examined was only method claim.

The examiner rejected the claim by obvious-type double patenting over claim 1 of U.S. Patent No. 5,715,444 and claim 9 of U.S. Patent No. 5,983,219. The examiner also rejected the claim under 35 U.S.C. §102 (e) (Pre-AIA) as being anticipated by U.S. prior patent.

The applicant amended the claim 1 by adding several elements into the claim. The applicant also added one independent claim. After the amendment, the examiner granted the patent, and the patent was issued on August 14th 2001.

JP Examination result

JP family patent application had two independent claims. One was a method claim and the other was a system claim. In the first office action, the examiner rejected both method and system claims by lacking of inventive step over two Japanese documents. After the first office

(d) accepting a selection criteria of more than one of said alternatives,
(e) determining the subfamily of items wherein each said item in the subfamily satisfies said selection criteria,
(f) in the event the subfamily comprises zero items, deselecting the most recently selected alternative of that selection criteria,
(g) determining the subfamily of items wherein each said item in the subfamily satisfies said selection criteria as modified by the deselection of the most recently selected alternative,
(h) revising said feature screen to indicate the available alternatives of the subfamily.
(See U.S. Patent No. 6,275,821 col.19-20.)

action, the applicant did not respond to the office action. Therefore, the patent application was automatically rejected as a final rejection.

EP Examination result

In the first office action, the EPO examiner rejected all of the claims because the claims were not clear. The examiner postponed the examination regarding novelty and inventive step until clear set of claims were filed. After the first office action, the applicant amended the claims in order to overcome the rejection. The amended claims were granted a patent, and the patent was issued on February 12th 2003.

iv. Analysis

V. Claim Definiteness and Patent Eligibility

- a. Lenient Requirement for Non Section 112(f) Functional Claims
- b. Pre-*Allapat-State Street Bank* Practice
- c. *In re Allapat; State Street Bank*
- d. JPO Practice
- e. EPO Practice

VI. Broadest Possible Construction

- a. Pre *In re Donaldson* Examination Practice

The case studies on patent examination at the patent offices revealed that the narrow claim construction under §112(f) results in broader and ambiguous functional claims issued at USPTO. When the USPTO adopted the broadest reasonable construction not being limited by

the physical features of the embodiments in the specification, the USPTO applied patentability and description requirements more rigorously than the current examination practice which is similar to the current examination practice at the JPO and EPO.⁵¹

In particular, to reject a means-plus-function claim for anticipation, the USPTO needed to show that an apparatus or process in the prior art included physical features which perform the functions recited in the claim.⁵² Under the pre *In re Donaldson* CCPA case law and the USPTO practice, applicants could not rely on means-plus-function elements which are disclosed in the specification but not included in the claim to distinguish the prior art.⁵³ Then the burden shifted on applicants who establish that any of physical feature in the prior art does not perform the corresponding function in the claim or had to amend claim elements to add physical features that distinguish the structure in the prior art.

This pre-*In re Donaldson* practice is perfectly in line with the current practice at the JPO and the EPO. The JPO Examination guidelines

Soon after the creation of its creation, this practice was struck down by the Federal Circuit in *In re Bond*.⁵⁴ The court emphasized the narrow construction reading disclosed physical features from the specification into the claim under §112(f) covering the disclosed structure, material or acts and their equivalents. While acknowledging the prior art disclosing all elements

⁵¹ For discussion of pre-*In re Donaldson* case law on means-plus-function claims, see Rick Nydegger, “Traversing the Section 112, Paragraph Six Field of Land Mines: Does *In re Donaldson* Adequately Defuse the Problems? (Part II),” 76 J. Pat. & Trademark Off. Soc’y 947 (1994) 77 J. Pat. & Trademark Off. Soc’y 30 (1995)[Hereinafter, Nydegger, “Traversing the Section 112”]; Silverberg, “The Patent and Trademark Office Clashes with the Federal Circuit Over Means Plus Function,” 74 J. Pat. & Trademark Off. Soc’y 675 (1992); Adamo, “Do the Means Justify the End—A Matter of *Bond*, *Bowles*, The Office and 35 U.S.C. § 112, Paragraph 6,” 74 J. Pat. & Trademark Off. Soc’y 566 (1992); Whitmeyer, “The Patent and Trademark Office’s Refusal to Follow *In re Bond*,” 74 J. Pat. & Trademark Off. Soc’y 397 (1992).

⁵² *Ex parte Olaf L. Isaksen*, 23 U.S.P.Q.2D 1001 (Bd. Pat. App. & Interferences Dec. 13, 1991).

⁵³ *In re Lundberg*, 44 C.C.P.A. 909, 244 F.2d 543, 113 U.S.P.Q. 530 (C.C.P.A. 1957).

⁵⁴ *In re Bond*, 910 F.2d 831, 1990 U.S. App. LEXIS 13087, 15 U.S.P.Q.2D 1566 (Fed. Cir. 1990).

performing the functions recited in the claim, the court vacated the USPTO's Board decision because the Board did not address the question whether the disclosed structure performing the function recited in the claim was structurally equivalent to the structure embodied in the prior art.⁵⁵ The USPTO challenged the new rule to impose an additional burden to find structural equivalency between the elements in the means-plus-function format and the physical feature performing the claimed function by issuing a Notice on In re Bond⁵⁶ and Ex Parte Research and Manufacturing Co., Inc, emphasizing the USPTO long established practice on the broadest reasonable interpretation for rejecting claims on the prior art during the prosecution.⁵⁷

Pre-*In re Donaldson* case law imposes an additional requirement for defining an element by its function. In principle, functional claims to cover a result rather than a process or a thing were invalid because of the scope of such claims are overbroad.⁵⁸ A limited use of functional claiming is permissible or even desirable only if the claim accurately define the essential qualities of the invention to one skilled in the art of the invention.⁵⁹ Despite of the narrow claim construction under §112(f), functional claims were valid for clearly point out the subject matter that the inventor regards as his invention only if the claims structurally describe the physical and operating relationship of all the crucial parts of the novel combination.⁶⁰ The CCPA emphasized the difference on the role of claim language between infringement and examination at the USPTO: any ambiguity of the claim language could be clarified in light of the

⁵⁵ Bond, 910 F.2d at 833.

⁵⁶ Nydegger, "Traversing the Section 112, supra note 44, at 45.

⁵⁷ 10 U.S.P.Q.2D (BNA) 1657 (Bd. Pat. App. & Interferences Mar. 9, 1989)

⁵⁸ *Holland Furniture Company v. Perkins Glue Company*, 277 U.S. 245, 72 L. Ed. 868, 48 S. Ct. 474 (U.S. 1928).

⁵⁹ *GE Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 58 S. Ct. 899, 82 L. Ed. 1402 (U.S. 1938); *In re Fuetterer*, 50 C.C.P.A. 1453, 319 F.2d 259, 138 U.S.P.Q. 217 (C.C.P.A. 1963).

⁶⁰ *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 28 S. Ct. 748, 52 L. Ed. 1122 (U.S. 1908); *In re MERCIER*, 36 C.C.P.A. 880, 173 F.2d 249, 81 U.S.P.Q. 122 (C.C.P.A. 1949); *In re Horton*, 33 C.C.P.A. 704, 151 F.2d 210, 1945 CCPA LEXIS 514, 67 U.S.P.Q. 105 (C.C.P.A. 1945)

specification in infringement procedure in contrast that the claim language must particularly point out and distinctly claim the invention during the examination at the USPTO.⁶¹

Moreover, under the pre-*In re Donaldson* case law, the broadest possible construction without limitations under §112(f) provided a big hurdle for software patents. When a computer implemented invention is drafted in the means-plus-function format, the USPTO imposed on applicants an additional burden on functional claims for showing that the claim is sufficiently limited so as to drawn to a specific apparatus distinct from other apparatus capable of performing the identical function.⁶² When applicants were unable to meet the burden, apparatus claims were treated as method claims.⁶³ When corresponding methods are directed to an abstract idea, both apparatus and method claims were rejected for lack of eligibility.

b. In Re Donaldson

In re Donaldson removed all of these additional hurdles for using functional claims. In *In re Donaldson*, claims are directed to industrial air-filtering dust collecting devices.⁶⁴ The invention addressed the problem in the conventional devices in which the dust accumulated in the hopper tends to harden which prevents the dust from moving downward to be collected in the chamber at the bottom of the device. To break up and dislodge the dust from the wall of hopper and move it downward, the inventor adopted a flexible material for the hopper wall so that the wall functions like a diaphragm by expanding outward in response to the temporary pressure increases. These features were defined by a function in the claim on appeal, instead of the structure: “means, responsive to pressure increases in said chamber caused by said cleaning

⁶¹ *In re Arbeit*, 41 C.C.P.A. 719, 206 F.2d 947, 1953 CCPA LEXIS 157, 99 U.S.P.Q. 123 (C.C.P.A. 1953).

⁶² *In re Application of Walter*, 618 F.2d 758, 205 U.S.P.Q. 397 (C.C.P.A. 1980).

⁶³ *Id.* at 769.

⁶⁴ *In re Donaldson Company, Inc.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994).

means, for moving particulate matter in a downward direction to a bottommost point.” The USPTO Board rejected the claim for obviousness under §103 relying solely on one reference, a U.S. patent issued to Swift. The Swift invention performs the function, moving the dust downward, by adopting pulses of compressed, high energy gas to dislodge dust from the rigid hopper wall and move the dust downward to the bottom. Thus, the Board found that the function recited in the means element was performed by the Swift’s hopper. The Board rejected Donaldson’s argument that the Swift patent did not disclose the diagraph like flexible wall because the claim did not include limitations on the physical structure.

The *en banc* Federal Circuit agreed with Donaldson that the Swift patent did not teach or suggest the diagraph like flexible wall and thus the USPTO Board erroneously rejected the claim for obviousness. The court not only struck down the USPTO’s broadest reasonable construction practice to cover any equivalents to perform the function, it also eliminated the requirement for defining structurally or physically with respect to the features to distinguish the prior art. In importing structures from the embodiments disclosed in the specification into the means element through claim construction under §112(f) instead of requiring Donaldson to amend claims to include the structural limitations, the court found the claimed device is not only new but also nonobvious from the device disclosed in the Swift patent.⁶⁵

The court endorsed the USPTO’s burden in *In re Bond* for making a prima facie case of equivalence to reject functional claims for anticipation and nonobviousness. The burden does not shift until the USPTO establish that the structure disclosed in a prior art reference not only performs the function recited in the claim but also is structurally equivalent to the structure disclosed in the specification to perform the function recited in the means element.⁶⁶ The

⁶⁵ *Id.*, at 1195.

⁶⁶ *Id.*, at 1197.

USPTO failed to meet this burden because the court found that the USPTO's assertion speculative with respect to the function performed by the corresponding structure in the Swift patent. The court was not convinced whether the Swift's hopper wall moves particulate matter in a downward direction in responsive to pressure increase in the chamber caused by a cleaning means. Even if the hopper performs the function, the USPTO failed to meet the burden because it did not established the Swift's hopper structure was structurally equivalent to the flexible diaphragm like structure disclosed in the Donaldson's specification. To reject a claim for nonobviousness, the USPTO must establish that the structure in the prior art teaches or suggest the corresponding structure in the specification for performing the prior art.

To strike down the USPTO practice, the *en banc* court made clear the narrow claim construction under §112(f), applies both examination and infringement and overruled its precedent which suggest or held any distinction.⁶⁷ The court relied on the fact that §112(f) is part of the chapter of the patent statute entitled to "Application for Patent" and the language of §112(f) does not distinguish prosecution from enforcement. It rejected the USPTO Commissioner's argument that §112(f) codified the reverse doctrine of equivalents for means-plus-function in the litigation context. In its view, Congress overruled the Supreme Court's holding in *Halliburton Oil* that the means-plus-function language could not be employed at the exact point of novelty in a combination claim.⁶⁸

The *Donaldson* Court also made clear that functional claims must meet the enablement, written description and definiteness requirements under §112(a) and (b).⁶⁹ Pre-*In re Donaldson* case law has already apply the same standard for description and definiteness requirements apply

⁶⁷ Id., at 1192. §112(f) was §112¶6 when *In re Donaldson* was decided.

⁶⁸ Id., at 1194.

⁶⁹ Id., at 1195.

to an element in the means-plus-function format.⁷⁰ In particular, to meet the definiteness requirement under §112(b), the specification must disclose the structures, materials, acts and other physical features which performing the corresponding function recited in the element.⁷¹ The specification must be understood by one skilled in the art to disclose a structure; it is not sufficient that one skilled in the art would be able to implement a structure.⁷²

c. Post *In-Re Donaldson* Case Law

The additional burden for making a *prima facie* of equivalence presents a high hurdle for the USPTO to reject functional claims for anticipation and nonobviousness. To meet the additional burden, examiners must produce substantial evidence to support the finding of structural equivalence.⁷³ The USPTO published supplemental examination guidelines to examine claims in the means-plus-function format.⁷⁴ The guidelines require examiners finding that the corresponding structure in the prior art (1) performs the function specified in the claim; (2) is not excluded by any explicit definition in the specification for an equivalent and (3) is an equivalent of the means or step plus function limitation. A rejection must accompany with an explanation and rationale as to why the prior art element is equivalent to the claimed element. To establish (3) the structural equivalence between the structures in the specification and the embodiment, the prior art structure must perform the identical function of the corresponding structure disclosed in the specification performing the claimed function in substantially the same way and produces

⁷⁰ *In re Knowlton*, 481 F.2d 1357, 178 USPQ 486 (CCPA 1973).

⁷¹ *In re Dossel*, 115 F.3d 942, 42 USPQ2d 1881 (Fed. Cir. 1997).

⁷² *Atmel Corp. v. Information Storage Devices*, 198 F.3d 1374, 53 U.S.P.Q.2D 1225 (Fed. Cir. 1999).

⁷³ *In re Baxter International, Inc.*, 678 F.3d 1357 (Fed. Cir. 2012).

⁷⁴ MPEP §2183.

substantially the same result as the corresponding disclosed structure.⁷⁵ Examiners can establish the equivalent by showing the interchangeability between the structures disclosed in the prior art⁷⁶ and the specification or the insubstantial difference between these structures.⁷⁷ As highlighted by the hopper wall in *In re Donaldson*, the court may find the USPTO's finding of equivalence speculative without resort to any facilities to conduct experiments on the structures disclosed in the specification and the prior art.⁷⁸

In contrast, the case law imposes an additional burden for meeting the description requirements under §112(a) and (b) and made it easy for the USPTO to reject functional claims. Claims are indefinite §112(b) if the specification does not provide an adequate disclosure §112(a) because it does not disclose the corresponding structures, materials, acts and other physical features to perform the function.⁷⁹ Examiners should reject claims for indefiniteness if one skilled in the art could not find a disclosure of the structure and other physical features in the specification even though these features are well known in the art of invention and thus one skilled would be able to find the structure.⁸⁰ Moreover, claims are indefinite even if the corresponding structure and other physical features are disclosed in the specification unless the written description of the specification or prosecution history clearly links or associate the structure to the function being performed by the structure.⁸¹

⁷⁵ *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 54 U.S.P.Q.2D (BNA) 1308 (Fed. Cir. 2000).

⁷⁶ *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2D (BNA) 1161 (Fed. Cir. 1999)

⁷⁷ *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 117 S. Ct. 1040, 137 L. Ed. 2d 146, 1997 41 U.S.P.Q.2D 1865 (U.S. 1997)

⁷⁸ *In re Donaldson*, 16 F.3d at 1197.

⁷⁹ *Atmel Corp. v. Information Storage Devices, Inc.*, 198 F.3d 1374, 53 USPQ2d 1225 (Fed. Cir. 1999).

⁸⁰ *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 3, 83 U.S.P.Q.2D (BNA) 1118 (Fed. Cir. 2007)

⁸¹ *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1997 U.S. App. LEXIS 23563, 43 U.S.P.Q.2D (BNA) 1896 (Fed. Cir. 1997)

Recently, the Federal Circuit imposes a high standard for finding the adequate disclosure as long as means-plus function claims on computer implemented inventions are concerned: With respect to any functional element, not only a structure of hardware resources in a computer but also algorithms for performing the function must be disclosed in the specification if the computer is a general purpose computer and software converts the computer to a specific purpose computer.

⁸² A flow chart merely showing results may not give rise to a disclosure of the corresponding structure for performing the function if it fails to describe how a computer be programmed to product the result.⁸³ An exception to this rule is algorithms for performing well-known mathematical operations.⁸⁴ Although an algorithm can be described in any understandable formula, a disclosure of a general purpose computer without any details of how to implement the corresponding functions give no limit to the claim in the means-plus-function format and thus fails to perform the notice function.⁸⁵ Moreover, the specification cannot omit a disclosure of a specific structure entirely by referring non-patent publications disclosing the structure.⁸⁶

Despite of the additional burden on patent owners for meeting the description requirements, the Federal Circuit seldom finds a claim failing to meet the description requirements once it found the disclosure of the corresponding structure and link between the structure and the function. Although the scope of functional claims covers not only the corresponding structures but also their equivalents, neither the Federal Circuit or the USPTO does not address a question whether one skilled in the art would be able to find an alternative element to perform the function and can determine the scope defined by equivalents.

⁸² *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 86 U.S.P.Q.2D (BNA) 1609 (Fed. Cir. 2008)

⁸³ *In re Aoyama*, 656 F.3d 1293 (Fed. Cir. 2011).

⁸⁴ *Aristocrat Techs. Austl. PTY Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 86 U.S.P.Q.2D 1235 (Fed. Cir. 2008)

⁸⁵ *Finisar Corp.* 198 F.3d at 1341.

⁸⁶ *Id.*, at 1381.

VII. Easy Fix

a. Option 1: Overruling *In Re Donaldson*

In re Donaldson made difficult for the USPTO to reject claims for anticipation and nonobviousness as well as claim indefiniteness and deprive from the USPTO an opportunity to require applicants introducing structural limitations when a claim element is drafted in the means-plus-functional claims. Moreover, *In re Donaldson* should be overruled to the extent that it is inconsistent with functional claiming under the Pre-*Halliburton Oil* case law. As acknowledged by the *en banc* Federal Circuit, Congress enacted §112(f) to restore the claim drafting practice endorsed by the pre-*Halliburton Oil* case law.⁸⁷ The Supreme Court emphasized the narrow target that §112 (f) was enacted to overrule its holding in *Halliburton Oil* so as to preserve the functional claim drafting practice.⁸⁸ Instead of restoring the functional claim drafting, *In re Donaldson* expanded the practice by giving a projection against anticipation and nonobviousness rejections from the USPTO. Moreover the legislative history supports that Congress did not intent to apply §112 (f) narrow claim construction during the examination at the USPTO.

None of the Supreme Court precedents involving functional claiming dealt with the validity based on the prior art. Instead the Court is concerned the over-reaching scope of patent issued on functional claims to cover defendants' product or process which were not described or enabled by the written description of the specification. The very first case, *O'Reilly v. Morse* struck down the validity of a claim including only one element defined by its function instead of

⁸⁷ *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 71 USPQ 175 (1946)

⁸⁸ *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 117 S. Ct. 1040, 137 L. Ed. 2d 146, 1997 U.S. LEXIS 1476, 65 U.S.L.W. 4162, 41 U.S.P.Q.2D (BNA) 1865, 97 Cal. Daily Op. Service 1540, 97 Daily Journal DAR 2249, 10 Fla. L. Weekly Fed. S 321 (U.S. 1997)

its structure or physical features.⁸⁹ Morse improved the telegraph system by addressing the problem in the conventional system that a signal became weaker as it advanced on the wire. Morse patent disclosed a relay system to boost the diminished force of electromagnetism in long circuits. However, the inventor Morse included the following claim, attempting to cover any current and after-arising circuits using the motive power of the electromagnetism :

“I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electromagnetism, however developed, for making or printing intelligible characters, signs or letters at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer”⁹⁰

The Supreme Court found the scope of the claim too broad and invalid because the claim violates the enablement requirement that the inventors must specify the means he uses in a manner so full and exact, that any one skilled in the science to which it appertains, can, by using the means he specifies, without any addition to, or subtraction from them, produce precisely the result he describes.⁹¹ The Court emphasized that the scope of exclusive right is limited to the means the inventor specified to produce the result or effect the inventor described in the specification but nothing more. Thus, anyone can free adopt a means to accomplish the result or effect described by a patent without infringement if the means is substantially different from the means described in the patent.

O'Reilly was cited by the Supreme Court in *Holland Furniture v. Perkins Glue* to prevent patentees from extending the patent protection to devices or mechanisms not described in the

⁸⁹ *O'Reilly v. Morse*, 56 U.S. 62, 14 L. Ed. 601, 1853 U.S. LEXIS 273, 15 HOW 62 (U.S. 1854)

⁹⁰ Morse's reissued U.S. patents, dated June 13, 1948.

⁹¹ 56 U.S. at 119.

patent by drafting a claim to define an invented machine by its result or function.⁹² Like *O'Reilly*, the inventor defined his invention, the use of starch glue for wood veneering and similar use by its function instead of its physical characteristics. Animal glues had been used in such processes because starch glues' high water content delayed drying and tended to warp the wood. The inventor developed an improved process by making a semifluid glue base through a degeneration process to remove water from starch glues. The resulting glue base was treated by adding about 3 parts or less by weight of water and alkali metal hydroxide. Although both steps are in the prior art, starch glues treated by these two steps could bind wood as strong as animal glues while avoiding the warping problem.

To cover any starch glue having similar properties to bind wood, the inventor included a claim:

“A wood and fiber glue containing amylaceous material as a base dissolved without acid in about three parts of water or less, and being viscous, semifluid andunjellified.”

The Supreme Court again invalidated the claim for failing to meet the enablement by condemning the inventor's attempt to extend the protection beyond what was described in the specification by defining starch glue in terms of its use or function to bind wood as good as animal glue.⁹³ The Court emphasized on the uncertainty to draw the boundary of exclusive right with respect to the patentee's claim because competitors need undue experimentation to avoid infringement. Although other claims included in the patent were rejected over the prior art, no prior art was cited for the claim defined by the function.

⁹² *Holland Furniture Co. v. Perkins Glue Co.*, 277 U.S. 245, 48 S. Ct. 474, 72 L. Ed. 868, 1928 U.S. LEXIS 686 (U.S. 1928)

⁹³ 277 U.S. at 256-258.

Holland was cited by the Supreme Court in *GE Co. v. Wabash Appliance Corp.* for the proposition that a patentee may not broaden his product claims by describing the claim in terms of function.⁹⁴ The claim at issue defined a filament for electric incandescent lamps as being composed substantially of tungsten and made up mainly of a number of *comparatively large grains of such size and contour as to prevent substantial sagging and offsetting* during a normal or commercially useful life for such a lamp or other device. The patentee used the functional language to distinguish his improvement from the conventional tungsten used as a filament. Although the Court condemned the use of functional terms to describe features to distinguish the prior art at the exact point of the novelty, it endorsed the limited use of functional terms if such terms “accurately define the essential qualities of a product to one skilled in the art.”⁹⁵ In other words, a claim can define conventional features by functional terms if one skilled in the art could understand the structures, materials and other physical features to perform the function.

The Court in *Halliburton* applied the point of novelty doctrine to prevent the patentee from using functional terms to describe the patentee’s improvement over the conventional apparatus for measuring the depth of oil well by a sound-echo-time method.⁹⁶ The inventor improved the method to obtain a more accurate measurement by taking account of the structure of oil wells which adopted oil flow pipe consisting of tubing. Because the calculation of the depth depended on the distance between the parts called “collars” connected to the tubing and the projections on the oil flow pipe known as tubing catchers. For calculating the distance accurately, it was necessary to distinguish echoes from the collars from echoes from other parts and noises.

⁹⁴ *GE Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 58 S. Ct. 899, 82 L. Ed. 1402, 1938 U.S. LEXIS 1144 (U.S. 1938)

⁹⁵ 304 U.S. at 371.

⁹⁶ *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 71 USPQ 175 (1946).

The inventor adopted a conventional sound filter to identify the collar echo wave impulses on the graph. The patent claims define the resonator by its function:

In an apparatus for determining the location of an obstruction in a well having therein a string of assembling tubing sections inter-connected with each other by coupling collars, means communicating with said well for creating a pressure impulse in said well, echo receiving means including a pressure responsive device exposed to said well for receiving pressure impulses from the well and for measuring the lapse of time between the creation of the impulse and the arrival at said receiving means of the echo from said obstruction, and *means associated with said pressure responsive device for tuning said receiving means to the frequency of echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other.*⁹⁷

Again, the Court's concern was the patentee's attempt by adopting the functional terms to stretch his patent protection to an embodiment not disclosed in the specification, an electrical sound resonator adopted by the defendant. The Court found that the sound filtering function distinguished the prior art and thus is at the point of novelty. In *Halliburton*, the patent specification disclosed a mechanical acoustical resonator but none of claims included in the patent include limitations on the physical structure of the resonator. In invalidating the GE's patent, the Court emphasized the notice function of claim and uncertainties introduced by functional claiming as the burden on the public to

⁹⁷ 329 US at 9, n.7.

find the boundary with undue experimentations on existing and after-arising technologies to perform the sound filtering function recited in the claim.⁹⁸

In short, the Court banned functional claiming with respect to the features to distinguish the prior art to prevent patentees from undermining the notice function of the claim and from extending the patent protection to what was not in possession by the inventor and not enabled by the disclosure of the specification. To remedy the notice function and enablement/written description concerns, Congress introduced a special claim construction rule for means-plus-function claims to limit the scope to structures, materials, and acts for performing the function recited in the claim and their equivalents.⁹⁹ Although the *en banc* Federal Circuit discounted the Reviser's Notes published by then Examiner-in-Chief of the USPTO as a legislative history, the Notes clearly indicated that the special claim construction does not apply to the claim construction for determining patentability during the examination. Nothing in the Court's Pre-*Halliburton* case law suggests condemning claim construction to reject or invalidate a patent over the prior art.

The lenient standard for the claim definiteness and adequate disclosure requirements applied to the functional claims which do not fall into the narrow applicability of the means or steps for function claims under §112(f) is inconsistent with the Supreme Court Precedents where a more stringent claim definiteness and adequate disclosure requirements were applied to functional claiming. Functional claiming must give a clear notice on the boundary of the exclusive right to the public without undue experience. If an applicant avoid §112(f) claim construction by

⁹⁸ 329 U.S. at 12.

⁹⁹ Reviser's Note, [35 USC § 112](#), H.R. Rep. No. 1923, 82d Cong., 2d Sess. 19 (1952).

Functional claiming practice under the pre-*Halliburton Oil* case law is very similar to the current practice at the EPO and JPO. Under the EPO case law, applicants can define an element of invention by its function if (1) such features could not otherwise be defined more precisely without restricting the scope of the invention, and (2) the element include sufficient instructions to one skilled in the art to find structures performing the function without undue experimentation.¹⁰⁰ As emphasized by the Federal Circuit, the EPO board emphasized that the same standard applies to functional claims and claims defined by physical features.

Thus, one skilled in the art should understand

b. Option 2: Shifting the Burden for Making Structural Equivalence to Applicants

VIII. Conclusion

¹⁰⁰ T68/85, OJ 1987, 228