Who’s Afraid of Functional Claims? Reforming the Patent Law’s §112, ¶ 6 Jurisprudence

Mark D. Janis

Indiana University Maurer School of Law, mdjanis@indiana.edu

Follow this and additional works at: https://www.repository.law.indiana.edu/facpub

Part of the Intellectual Property Law Commons

Recommended Citation


https://www.repository.law.indiana.edu/facpub/614
WHO'S AFRAID OF FUNCTIONAL CLAIMS?
REFORMING THE PATENT LAW'S § 112, ¶ 6 JURISPRUDENCE*

By Mark D. Janis†

---

**TABLE OF CONTENTS**

I. INTRODUCTION................................................................. 233

II. FUNCTIONAL CLAIMING BEFORE HALIBURTON:

    A REASSESSMENT OF § 112, ¶ 6'S ANCESTRY ...................... 238

A. Pre-1952 Origins of the "Disclosure Plus Equivalents"
Restriction on Functional Claims......................................... 240

B. The Disclosure-Plus-Equivalents Restriction as a
Strategy for Addressing Indefiniteness and Ineligibility
Concerns ........................................................................... 242

C. The Disclosure-Plus-Equivalents Restriction as a Central
Claiming Strategy.............................................................. 249

    1. "Strict" Construction of Combination Claims .......... 249
    2. Functional Claiming Doctrine as a Straightforward
        Application of Central Claiming Principles ............ 251
    3. Functional Claiming Doctrine and the Doctrine of
        Equivalents in Its Central Claiming Incarnation ..... 253

III. FUNCTIONAL EXPRESSIONS AND THE LITERAL INFRINGEMENT

    ANALYSIS .................................................................... 257

---

* Copyright © 1999 Mark D. Janis

† Associate Professor of Law, University of Iowa College of Law. B.S. Che. Purdue
University; J.D. Indiana University-Bloomington School of Law. The author gratefully
acknowledges research support provided by Dean N. William Hines and the University of Iowa
College of Law.
A. Banishing "Structural Equivalency" from § 112, ¶ 6
   Jurisprudence.........................................................................259

B. Incorporating Graver Tank and Warner-Jenkinson
   Equivalency Concepts into § 112, ¶ 6 Literal Infringement
   Determinations .......................................................................265
   1. Insufficient Differences .....................................................265
   2. Known Interchangeability .................................................266
   3. Obvious Variation .............................................................267
   4. Substantial Similarity of "Way" ............................................268

IV. FUNCTIONAL EXPRESSIONS AND THE DOCTRINE OF
    EQUIVALENTS ........................................................................272
    A. A Framework for Applying the Doctrine of Equivalents to
       Means-Plus-Function Clauses...............................................273
    B. Chiurinatta: Some Equivalents are More Equivalent than
       Others? ..............................................................................276

V. FUNCTIONAL EXPRESSIONS AND TRADITIONAL LIMITATIONS ON
   EQUIVALENCY .......................................................................280
    A. Prosecution History.........................................................281
    B. Prior Art............................................................................287

VI. LIFE WITHOUT § 112, ¶ 6......................................................290
    A. Who's Afraid? Probing the Functional Claiming Anxiety
       Closet..................................................................................292
       1. Exaggerated Fears of Overbreadth .................................292
       2. Vague Apprehensions of Indefiniteness .........................296
    B. Conclusion .........................................................................297
I. INTRODUCTION

A functional claiming phobia has long gripped U.S. patent jurisprudence. It is manifested doctrinally in decisions holding that functional expressions in patent claims are either so abstract, indefinite, or overbroad as to frustrate the patent law’s Constitutional mandate to promote the progress of useful arts. Its roots run deep, to early nineteenth century patent decisions.

1. “Functional” patent claims, or, more precisely, “functional” expressions appearing in claims, describe subject matter in terms of what that subject matter does (its function) rather than what it is. A commonplace functional claiming format employs the generic term “means” followed by a functional statement, and accordingly is denominated “means plus function” format. For example, in means-plus-function format, a nail might be claimed, functionally, as “means for attaching.” Similarly, a collection of circuit components in a complicated electrical schematic (or a collection of complex software routines) might be claimed together functionally as, say, “means for calculating.”

Early literature developed the notion of a functional claiming doctrine under which claims deemed functional might be held invalid or construed narrowly. For a characteristic articulation of the functional claiming doctrine, see, for example, L. T. Phelan, Functionality in Claims, 31 J. PAT. OFF. Soc’y 833, 834 (1949) (“[A] claim is invalid for ‘functionality’ when in terms, or practical effect, it comprehends all solutions of the problem involved rather than the particular solution, or solutions, including equivalents, discovered or invented by the patentee.”). Deller devoted an entire treatise chapter to the functional claiming doctrine. See ANTHONY W. DELLER, 1 PATENT CLAIMS Ch. 16 (2d ed. 1971).

2. In theory, each of these three terms invokes distinct objections to patentability. In the history of the functional claiming doctrine, the distinctions have often become muddied. See infra Part II for a characterization of the early case law with reference to abstractness, indefiniteness, and overbreadth. See infra Part VI for a reflection on the consequences of intermingling these objections and implications for reform proposals.

3. That mandate appears in U.S. CONST. art. I, § 8, cl. 8.

4. A famous early example is Joseph Story’s opinion in Wyeth v. Stone, 30 F. Cas. 723 (C.C.D. Mass. 1840). As Story summarized the issue:

The specification states: ‘It is claimed, as new, to cut ice of a uniform size, by means of an apparatus worked by any other power than human. The invention of this art, as well as the particular method of the application of the principle, are claimed by the subscriber’ (Wyeth). It is plain, then, that here the patentee claims an exclusive title to the art of cutting ice by means of any power, other than human power. Such a claim is utterly unmaintainable in point of law. It is a claim for an art or principle in the abstract, and not for any particular method or machinery, by which ice is to be cut. No man can have a right to cut ice by all means or methods, or by all or any sort of apparatus, although he is not the inventor of any or all of such means, methods, or apparatus.

Id. at 727. Interestingly, Story proceeded to apply a narrowing construction to save the claim:

It appears to me, that the language of the summary may be, and indeed ought to be construed . . . to mean by the words ‘the particular method of the application,’ the particular apparatus and machinery described in the specification to effect the purpose of cutting ice.

Id. at 727-28.
\[6\], which authorizes the use of certain types of functional expressions, but subjects them to a potentially severe restriction in scope: the expression covers only the corresponding structure, material, or acts disclosed in the patent, plus "equivalents" thereof.\(^5\)

This Paper reflects on the fear and loathing of functional claims, and proposes a variety of reforms. Part II reexamines the functional claiming doctrine as it existed prior to the enactment of \(\S\) 112, \(\¶\) 6. This historical synthesis demonstrates that \(\S\) 112, \(\¶\) 6's structure-plus-equivalents restriction derives predominantly from pre-1952 conceptions of how the patent law should deal with claim indefiniteness and claim scope problems.\(^6\)

The remainder of the Paper applies the lessons learned from the historical synthesis to the formulation of a two-track reform proposal. Parts III-V of the paper propose specific reforms to the existing \(\S\) 112, \(\¶\) 6 case law which can be implemented in the near term.\(^7\) Part VI proposes legislative reform (a longer term prospect) that eliminates the \(\S\) 112, \(\¶\) 6 equivalency concept altogether on the grounds that it responds to illusory problems of indefiniteness and overbreadth, using a mechanism that no longer fits with the modern claim construction regime.

The need for reform in \(\S\) 112, \(\¶\) 6 jurisprudence is especially acute for several reasons. First, as a practical matter, functional expressions in "means-plus-function" format are appearing with increasing frequency in the claims of litigated patents in recent years.\(^8\)

\(^5\) Specifically, \(\S\) 112, \(\¶\) 6 provides that:

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. 35 U.S.C. \(\S\) 112 (1994).

\(^6\) In examining how the functional claiming doctrine has developed in response to claim scope problems, the Paper focuses particularly on elaborating on the link between \(\S\) 112, \(\¶\) 6 equivalency and the doctrine of equivalents as it was understood in the central claiming regime. The Paper also focuses on the notion of undue claim breadth as an animating theme underlying the functional claiming doctrine.

\(^7\) The suggested reforms build on my previous work in this area. See Mark D. Janis, Unmasking Structural Equivalency: The Intersection of \(\S\) 112, \(\¶\) 6 Equivalents and the Doctrine of Equivalents, 4 ALB. L.J. SCI. & TECH. 205 (1994).

\(^8\) See, e.g., William F. Lee & Eugene M. Paige, Means Plus and Step Plus Function Claims: Do We Only Know Them When We See Them?, 80 J. PAT. & TRADEMARK OFF. SOC'Y 251, 251 n.1 (1998) (reporting a substantial increase in the number of cases in which courts refer to means-plus-function clauses).

The patent bar certainly has not reached any consensus as to the merits of means-plus-function clauses. For the view that such clauses remain important to the draftsman, see, for example, Gregory J. Maier & Bradley D. Lytle, The Strategic Use of Means-Plus-Function
and many of these cases involve assertions of § 112, ¶ 6 equivalency.¹⁹
Claims drafted in means-plus-function are especially prevalent in patents on software-related inventions, where the format has been thought useful for complying with the subject matter eligibility requirement.¹⁰

Second, courts applying § 112, ¶ 6 over the past four decades have never carefully integrated the § 112, ¶ 6 equivalency concept into the bipolar infringement regime,¹¹ leaving § 112, ¶ 6 equivalency to reside in a netherworld between literal and doctrine of equivalents infringement.¹² As a result, means expressions are now subject to bewildering case law under which § 112, ¶ 6 equivalents sometimes

Claims, 80 J. PAT. & TRADEMARK OFF. SOC’Y 241, 244-46 (1998) (arguing that means clauses are not inevitably narrower than clauses recited in structural format, and offering examples suggesting that the question is context dependent); Paul E. Schaafsma, Functional Language’s Death Knell is Exaggerated, 20 NAT’L L. J. C41 (May 18, 1998).

9. The apparent proliferation of means-plus-function language in U.S. patent claims might testify to the power of such language as a claims drafting tool. But the rise in litigation involving means-plus-function equivalency concepts could also be attributable to strategic behavior gone astray, or even misinformation. Prior to Donaldson, patent prosecution specialists who kept their distance from the courts encountered an environment in which means-plus-function clauses were read without regard for the limiting provisions of § 112, ¶ 6. See In re Donaldson, 16 F.3d 1189, 1193-94 (Fed. Cir. 1994) (en banc) (describing PTO’s practice); In re Lundberg, 244 F.2d 543, 548 (C.C.P.A. 1957) In re Lundberg was the principal authority relied upon by the PTO for its pre-Donaldson practice. It seems quite possible that many claims were drafted incorporating means-plus-function limitations with no real cognizance that the language would be subjected to the strictures of § 112, ¶ 6 in litigation. Assertions of § 112, ¶ 6 equivalency is the most likely recourse in such situations, which may partially explain why such assertions seem so prevalent today. See also Jeffrey N. Costakos & Walter E. Zimmerman, Do Your Means Claims Mean What You Meant?, 1 MARQ. INTELL. PROP. L. REV. 109, 111-12 (1997) (offering a similar explanation for the apparent “infatuation” of some patent lawyers with means language).

10. See, e.g., In re Alappat, 33 F.3d 1526, 1540-41 (Fed. Cir. 1994) (en banc) (holding that the restrictive provisions of § 112, ¶ 6 save claims from objectionable abstractness because they limit claims to a specific disclosed structure, and equivalents, by effectively importing specific disclosed structure from the patent specification into the claim). Indeed, Professor Toshiko Takenaka argues that U.S. software companies could suffer serious economic consequences relative to their overseas competitors if U.S. courts maintain a highly restrictive approach to functional claiming. See Toshiko Takenaka, Functional Claims: Discussions in Comparative Law Perspective, Address at the Finnegan Lectures, Washington, D.C. (Sept. 1998) (copy on file with author).

11. By the “bipolar” infringement regime, I mean the modern regime enunciated by the Federal Circuit under which claims may be infringed either under a theory of literal infringement (requiring exact literal correspondence between the elements of the claim and the accused infringing device) or under a theory of infringement under the doctrine of equivalents. See, e.g., Sage Prods. v. Devon Indus., 126 F.3d 1420 , 1423 (Fed. Cir. 1997).

12. Congress also deserves a share of the blame here for injecting an equivalency notion into § 112, ¶ 6 without explaining the relationship between § 112, ¶ 6 and the modern conceptions of the judicially developed doctrine of equivalents, enunciated only three years earlier in Graver Tank. See Graver Tank & Mfg. Co. v. Linde Air Prods., 339 U.S. 605, 608-09 (1949).
borrow characteristics from the doctrine of equivalents and sometimes do not.\textsuperscript{13} The Federal Circuit’s \textit{Dawn Equipment Co. v. Kentucky Farms, Inc.}\textsuperscript{14} decision dramatically illustrates the point. A seemingly straightforward § 112, ¶ 6 case generated a panel opinion\textsuperscript{15} and “additional views” from each of the three panel members,\textsuperscript{16} reflecting widely divergent viewpoints on the fundamental issue of the relationship of § 112, ¶ 6 equivalents to the doctrine of equivalents.\textsuperscript{17} Unfortunately, the § 112, ¶ 6 equivalency case law is only subject to further complication in view of the upheaval over the scope and meaning of “equivalents” in the doctrine of equivalents.\textsuperscript{18} Finally, the need for reform of § 112, ¶ 6 is evident, albeit indirectly, from the sudden emergence of a vexing and Byzantine threshold scheme for determining whether an arguably functional expression in fact qualifies as a “means plus function” expression subject to the restrictive provisions of § 112, ¶ 6. The Federal Circuit has distracted itself by creating an overly elaborate inquiry for determining whether clauses that expressly recite the term “means” actually invoke § 112, ¶ 6.\textsuperscript{19} Worse still, the court has perhaps unwittingly opened the

\begin{itemize}
  \item[13.] I deal with this issue in some detail in Part III. \textit{See infra} Part III.
  \item[14.] \textit{Dawn Equip. Co. v. Kentucky Farms, Inc.}, 140 F.3d 1009, 1014-17 (Fed. Cir. 1998).
  \item[15.] \textit{See id.} at 1010, 1014-17.
  \item[16.] \textit{See id.} at 1018, 1022-23.
  \item[17.] \textit{See infra} Parts III-IV for commentary on the \textit{Dawn Equipment} decision and another recent Federal Circuit decision dealing with the issue, Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., 145 F.3d 1303 (Fed. Cir. 1998).
  \item[19.] The Federal Circuit currently applies a weak presumption that a claim clause that uses the term “means” intends to invoke the restrictive provisions of § 112, ¶ 6. \textit{See York Prods., Inc. v. Central Tractor Farm & Family Ctr.}, 99 F.3d 1568, 1574 (Fed. Cir. 1996) (the source of the so-called \textit{York} presumption). \textit{See also} Hester Indus. v. Stein, Inc., 142 F.3d 1472, 1483 n.7 (Fed. Cir. 1998) (reciting the \textit{York} presumption); Ethicon, Inc. v. United States Surgical Corp., 135 F.3d 1456, 1463 (Fed. Cir. 1998) (reciting the \textit{York} presumption).
\end{itemize}
floodgates by declaring in *Mas-Hamilton Group v. LaGard, Inc.*,\(^{20}\) that clauses employing some functional recitations, without employing “means” terminology, qualify for treatment under § 112, ¶ 6.\(^{21}\) If the court as a whole takes *Mas-Hamilton Group v. LaGard,* that is not “sufficiently connected to a recited function.” *York,* 99 F.3d at 1573-74 (construing the claim language “means formed on the upwardly extending liner sidewall portions including a plurality of spaced apart, vertically extending ridge members protruding from the liner sidewall portions and forming load locks in gaps separating adjacent ones of the ridge members, said load locks having a depth sufficient to anchor a structure positioned and supported in the cargo bed”).

Adding to the complexity, in *Cole v. Kimberly-Clark,* the court concluded that a claim clause expressly reciting “means” did not invoke § 112, ¶ 6 because a true § 112, ¶ 6 clause “must not recite a definite structure which performs the described function.” *Cole v. Kimberly-Clark Corp.* 102 F.3d 524, 530-31 (Fed. Cir. 1996) (construing the claim language “perforation means extending from the leg band means to the waist band means through the outer impermeable layer means for tearing the outer impermeable layer means for removing the training brief in case of an accident by the user”).

The court reached a different result in a more recent case which likewise presented arguments (although fairly weak ones) that the claim language in question recited “definite structure” in the sense of *Cole* and failed to couple the recited “means” to a function in the sense of *York.* In *Unidynamics v. Automatic Products Int'l,* the court analyzed the claim language “spring means tending to keep the door closed” as § 112, ¶ 6 language. *Unidynamics Corp. v. Automatic Prods. Int'l,* 157 F.3d 1311, 1314 (Fed. Cir. 1998). The “tending” phrase expressed a function sufficiently linked to the “means.” *Id.* at 1318-19. Moreover, the presence of the term “spring” was not disqualifying “definite structure” in the sense of *Cole,* because the claim in *Cole* described not only “definite structure,” but also “the location and extent of the structure.” *Id.* at 1322. *Unidynamics* seems to reach a palatable result, but its effort to distinguish *Cole* seems entirely contrived and likely to lead to further confusion in the area as lower courts attempt to determine the “extent” of structure that is necessary to oust claim language from § 112, ¶ 6.


21. The Federal Circuit’s willingness to explore the applicability of § 112, ¶ 6 to functional expressions that did not expressly recite the “means” terminology first became apparent in the *Greenberg* decision, although the United States Patent and Trademark Office (PTO) had previously agitated the issue in its post-Donaldson examination guidelines. See Charles E. Van Horn, *Means or Step Plus Function Limitation Under 35 U.S.C. § 112 6th Paragraph,* 1162 OFFICIAL GAZETTE OF THE U.S. PAT. & TRADEMARK OFF. 59, 59 (May 17, 1994). In *Greenberg v. Ethicon Endo-Surgery,* the court agreed with the proposition (advanced in the PTO guidelines) that § 112, ¶ 6 could be triggered even in the absence of the term “means,” but determined that “it is fair to say that the use of the term ‘means’ (particularly as used in the phrase ‘means for’) generally invokes section 112(6) and that the use of a different formulation generally does not.” *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1584 (Fed. Cir. 1996) (holding that the clause “cooperating detent mechanism defining the conjoint rotation of said shafts in predetermined intervals” did not fall under § 112, ¶ 6).

In *Mas-Hamilton,* the court analyzed the following clause from claim 3 of the patent-in-suit:

*a substantially non-resilient lever moving element for moving the lever from its disengaged position for engaging the protrusion of the lever with the cam surface on the cam wheel so that the rotation of the cam wheel thereafter in the given direction changes the locking mechanism from the locked condition to the unlocked condition..."*
Inc. seriously, vast numbers of patent claims could now be subjected to the restrictive provisions of § 112, ¶ 6. This could contribute dramatically to the tremendous upsurge in § 112, ¶ 6 equivalency assertions.

II. FUNCTIONAL CLAIMING BEFORE HALLIBURTON:
A REASSESSMENT OF § 112, ¶ 6’S ANCESTRY

Contemporary judicial and scholarly accounts generally portray § 112, ¶ 6 as the Congressional response to the Supreme Court’s 1946 decision in Halliburton Oil Well Cementing Co. v. Walker [hereinafter Halliburton]. This conventional understanding of

Mas-Hamilton, 156 F.3d at 1213 (construing language from claim 3). The court also construed the following language from claims 34 and 43: “a movable link member for holding the lever out of engagement with the cam surface before entry of a combination and for releasing the lever after entry of the combination . . .” Id. at 1214.

The court convinced itself that the phrase “lever moving element” in claim 3 lacked any particular meaning to those of ordinary skill in the art, and thus treated it as if it were a generic “means” recitation. Id. at 1213-14. Because the remaining clauses were clearly functional, the court concluded that § 112, ¶ 6 should apply. See id. at 1214. Similarly perfunctory reasoning accompanied the court’s conclusion that § 112, ¶ 6 should also apply to the “movable link member” recitation in claims 34 and 43. Id. at 1215.

22. A recent opinion of the Federal Circuit provides some reassurance that the court will not blindly follow the lead of Mas-Hamilton. See Personalized Media Communications, LLC v. Int’l Trade Comm’n, 161 F.3d 696, 703-05 (Fed. Cir. 1998). In Personalized Media, the court considered whether a claim limitation reciting a “digital detector” coupled with functional recitations invoked § 112, ¶ 6. Id. at 698 (supplying the text of the claims at issue, including claim 6, which recited “a digital detector for receiving said transmission and detecting said predetermined signal in said transmission based on either a specific location or a specific time”). The court applied the converse of the York presumption, asserting that the failure to recite “means” gave rise to a presumption that § 112, ¶ 6 did not apply. Id. at 703-04 (citing Mas-Hamilton). Proceeding, the court relied on rhetoric from Sage Products v. Devon Industries:

In deciding whether either presumption has been rebutted, the focus remains on whether the claim as properly construed recites sufficiently definite structure to avoid the ambit of § 112, ¶ 6. Id. at 704 (citing Sage Prods., v. Devon Indus., 126 F.3d 1420, 1427-28 (Fed. Cir. 1997)). Applied here, the term “detector” assertedly had a well-known meaning in the art, and sufficiently connoted structure to take the clause outside § 112, ¶ 6. Id. (concluding that “‘[d]etector’ is not a generic structural term such as ‘means,’ ‘element,’ or ‘device’; nor is it a coined term lacking a clear meaning, such as ‘widget’ or ‘ram-a-fram.’”). It would certainly be premature to characterize Personalized Media as indicating a countertrend. Indeed, it may be significant that the court did not repudiate Mas-Hamilton.

23. See, e.g., Warner-Jenkinson, 520 U.S. at 27 (espousing the conventional view of § 112, ¶ 6 as a response to Halliburton). In Halliburton, the Court construed a claim which recited:

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.

Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 9 n.7 (1946) (reciting the language of claim 1). The Court struck down the claim as invalid on the basis that the clause in question
§ 112, ¶ 6’s origins may adequately illuminate § 112, ¶ 6’s first clause, because the Court in Halliburton seemed to rule that the use of a functional expression at the “point of novelty” rendered a claim invalid, while § 112, ¶ 6’s first clause expressly authorizes the use of means plus function (or step plus function) expressions in combination claims without regard to the point of novelty. But the portrayal of Halliburton as the sole reference point for understanding the restrictive “disclosure plus equivalents” rule of § 112, ¶ 6’s second clause is entirely unsatisfactory because it ignores decades of pre-Halliburton case law.

A more rigorous historical synthesis of pre-1952 law on functional claiming provides a number of important lessons for modern consideration of § 112, ¶ 6 jurisprudence. First, the restrictive “disclosure plus equivalents” construction of functional expressions currently embodied in § 112, ¶ 6 was well-established in the law before 1952. Second, analysis of the pre-1952 “functional claiming” law shows that the restrictive construction derives principally from a pair of judicial strategies: (1) a strategy for avoiding perceived invalidity and ineligibility problems; and (2) a strategy for directly regulating claim scope, especially through applying the doctrine of equivalents as it was understood in the central claiming regime.

represented the “point of novelty” of the claimed invention, but failed adequately to describe the physical structure of the invention. Id. at 8-9, 12-14.


See generally infra Parts III and VI for more detailed discussion of various aspects of the Halliburton decision.

24. See infra notes 57-59 and accompanying text for an explanation of the point of novelty concept as it operated in this context.

25. See infra note 70 and accompanying text for a discussion of the central claiming regime.
A. Pre-1952 Origins of the “Disclosure Plus Equivalents”
Restriction on Functional Claims

Long before the Supreme Court took up Halliburton and Congress enacted § 112, ¶ 6, a “disclosure plus equivalents” rule for functional expressions was familiar in many circuits. For example, as early as 1905, the Ninth Circuit was applying § 112, ¶ 6 principles to means clauses:

Of course, an inventor cannot by the mere use of the word ‘means,’ in reference to the accomplishment of a designated function in a combination claim, appropriate any and all kinds of mechanism or devices which may perform the specified function, or any other mechanism or device than that which is described in the patent or which is its equivalent. Reference must be had to the specifications to ascertain the means which are made an element of the claim and are protected by the patent.26

By 1908, these arguments reached the Supreme Court and were greeted with apparent approval. In Continental Paper Bag Co. v. Eastern Paper Bag Co.,27 the Court reviewed patent claims that contained the expression “operating means for the forming plate, adapted to cause the said plate to oscillate about its rear edge upon the surface of the cylinder during the rotary movement of said cylinder.”28 According to the alleged infringer’s counsel, because the claimed “operating means” did not expressly incorporate reference characters from the specification, the Court was forced to choose between two alternative interpretations.29 First, the Court could refer to “the descriptive part of the specification to ascertain what ‘operating means’ are meant, and then construe the claim as calling for those ‘operating means’ or their equivalent.”30 Alternatively, the Court could “ignore the descriptive part of the specification” and “construe the claim as being satisfied by any ‘operating means’ which can perform the particular function designated in the claim.”31 The alleged infringer argued that the circuit court had erroneously construed the claim in the latter fashion, and in doing so improperly

28. Id. at 420.
29. Id.
30. Id.
31. Id.
gave the patentee in effect a patent on the function.\textsuperscript{32}

The Supreme Court disagreed, but unfortunately failed to speak clearly on the legal question of which interpretation methodology was proper. Instead, after admitting that the distinction between a patent on a function and a patent on a "practically operative mechanism" is difficult to draw with precision,\textsuperscript{33} the Court refused to be engaged by "abstractions" and upheld the lower court's determination that the claim at issue was for a machine, not a function:

The claim is not for a function, but for mechanical means to bring into working relation the folding plate and the cylinder. This relation is the very essence of the invention, and marks the advance upon the prior art. It is the thing that had never been done before . . . .\textsuperscript{34}

Strictly speaking, this language seems to have left unresolved the question of the legal regime governing construction of functional expressions, but at the least it endorsed the use of functional expressions (however they might end up being interpreted) in cases where the true "invention" lay in the relationship between components of the combination.\textsuperscript{35}

Perhaps set in motion by the apparent endorsement in \textit{Continental Paper Bag Co. v. Eastern Paper Bag Co.}, the disclosed structure plus equivalents construction of functional claims was widely adopted before \textit{Halliburton}.\textsuperscript{36} Indeed, by 1937, the Eighth

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{32} Id. at 421.
\item \textsuperscript{33} The Court cited a passage from Professor Robinson's treatise that was routinely cited in early judicial opinions on the subject. \textit{Continental Paper}, 210 U.S. at 422, citing 1 \textsc{William C. Robinson, the Law of Patents for Useful Inventions} § 144 et seq. (1890).
\item \textsuperscript{34} Id.
\item \textsuperscript{35} Drawn in this narrow fashion, the Court left open the question of whether functional expressions could be used at the "point of novelty," — i.e., in cases in which the true "invention" could be isolated in a single expressed claim element rather than in the combination of elements. Later courts, most notably the Supreme Court in \textit{Halliburton}, exploited this possibility. See infra notes 53-59 and accompanying text (describing the point of novelty rule and its use in \textit{Halliburton}).
\item \textsuperscript{36} See, \textit{e.g.}, \textit{Hartford-Empire Co. v. Nivison-Weiskopf Co.}, 58 F.2d 701, 705 (6th Cir. 1932) (construing without comment a claim which apparently included a means clause as limited to "the mechanical equivalents of the means disclosed in the patent specifications"). \textit{See also} \textit{Doble Eng'g Co. v. Leeds & Northrup Co.}, 134 F.2d 78, 83 (1st Cir. 1943) (reporting lower court's analysis in which a claim was limited to cover "the Doble structure and its equivalents," but not "all means for accomplishing the same result"); \textit{Moore v. Frigidaire Corp.}, 71 F.2d 840, 843 (8th Cir. 1934) (noting the alleged infringer's argument that the claim at issue "did not cover anything more than those [disclosed] means or their substantial equivalents"); \textit{Rubenstein v. Slobotkin}, 33 F.2d 603, 608 (E.D. N.Y. 1929) ("The expression 'means' can only cover the specific thing shown in the description and drawing, together with a fair range of equivalents."); \textit{Kellogg Switchboard & Supply Co. v. Dean Electric Co.}, 182 F. 991, 1003 (6th Cir. 1910)
\end{itemize}
\end{footnotesize}
Circuit took it as a matter of "well-settled authority" that:

>a)n inventor cannot by the mere use of the word 'means' appropriate any and all kinds of mechanism or devices which may perform the specified function, or any other mechanism or device than that which is described in the patent or which is its mechanical equivalent.\footnote{Ford Motor Co. v. Gordon Form Lathe Co., 87 F.2d 390, 392 (8th Cir. 1937).}

Likewise, at least some scholars assumed that functional expressions would be limited in scope to the disclosure plus equivalents:

The patentee would not be bequeathed with an all inclusive monopoly, for a prescribed means or mechanism for accomplishing a desired end would still be limited to the particular means described in the specification, or their clear mechanical equivalents, and would not cover any other mechanical structure which is substantially different in its construction or in its operation.\footnote{See Peterson, supra note 23, at 207 (arguing that \textit{Halliburton} did not upset the prevailing general rule authorizing the use of means expressions in combination claims, but instead merely carved out an exception where means expressions were employed at the mythical "exact point of novelty").}

Of course, the observations that a functional claiming doctrine pre-existed \textit{Halliburton}, and was partially codified in \textsection 112, \textsection 6's second clause, raise further, more fundamental questions about what it was, exactly, that Congress codified. This, as detailed below, is a complicated undertaking.

\textbf{B. The Disclosure-Plus-Equivalents Restriction as a Strategy for Addressing Indefiniteness and Ineligibility Concerns}

A common early objection to functional claim language was that a claim element purporting to encompass any means for performing a stated function was either invalid or recited ineligible subject matter. As for invalidity, some courts held that claims containing unbridled\footnote{By "unbridled" or "unrestricted" I mean construing a means expression to encompass all means for performing the recited function.} functional expressions were likely to be fatally indefinite.\footnote{The then-governing statutory provision for indefiniteness, R.S. 4888, was a predecessor to today's \textsection 112, \textsection 2. See 35 U.S.C. \textsection 112 (1994).} For example, the Sixth Circuit in \textit{Hollingshead Co. v. Bassick Manufacturing Co.} invoked indefiniteness:

\footnote{Ford Motor Co. v. Gordon Form Lathe Co., 87 F.2d 390, 392 (8th Cir. 1937).} (construing a means clause as being limited to the circuit component disclosed in the specification).
It has often been stated that an element described in such general terms as to include every form of the element or device then known is sufficient except when the generic description can properly be interpreted to mean the particular form of the element set forth in the specifications. This necessarily follows from proper application of section 4888 of the Revised Statutes, as amended (35 U.S.C.A. § 33), which provides that the applicant for a patent shall file in the patent office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in full, clear, concise, and exact terms, and that he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery.41

Likewise, the First Circuit declared that

The functional claims doctrine stems from the statutory requirement of long standing that an applicant for a patent must particularly point out and distinctly claim what he regards as his invention. See R.S. § 4888, 35 U.S.C. § 33, and now Title 35 U.S.C. § 112. This requirement, the courts have repeatedly held, prevents a patentee from stating his invention in terms of the result he achieves instead of in terms of his method of achievement.42

Similar rhetoric can be found in opinions from other circuits.43

41. Hollingshead Co. v. Bassick Mfg., 73 F.2d 543, 547 (6th Cir. 1934), aff'd sub nom Bassick Mfg. Co. v. R.M. Hollingshead Co., 298 U.S. 415 (1936). (construing the expression "means co-acting with the ends of said pin for detachably connecting the discharge end of said conduit with said grease cup"). The appellate court declared in apparent frustration that owing to the "all inclusive generality and baffling obscurity of this element," only by referring "to the drawings and specifications" could the court accord the expression "any specific meaning." Hollingshead, 73 F.2d at 546.

42. S.D. Warren Co. v. Nashua Gummed & Coated Paper Co., 205 F.2d 602, 605 (1st Cir. 1953).

43. For example, construing a claim that recited "means for lifting the stopping means to release the balls stopped by it," the Court of Appeals for the Tenth Circuit found it necessary to "turn to the specifications" to preserve the claim against indefiniteness: "[i]f the words are construed to include every method of accomplishing the result, the claim is invalid for indefiniteness and uncertainty. A claim, alone or in light of the specifications, must describe a concrete apparatus, not an abstract function." Callison v. Pickens, 77 F.2d 62, 64 (10th Cir. 1935). See also Cincinnati Milling Mach. Co. v. Turchan, 208 F.2d 222, 225 (6th Cir. 1953) ("The word 'means' is itself an indefinite statement and as such must be interpreted in the light of the patent drawings and specifications."). See also DELLER, supra note 1, at § 292, at 814 (observing that functional expressions are frequently attacked as indefinite).

Halliburton itself purports to be an example of the use of an indefiniteness rationale to strike down a claim containing a functional expression. However, the Court's opinion wanders off track in so many respects that it is dangerous to characterize the case as a true application of an indefiniteness rationale. See infra notes 219-224 and accompanying text (explaining that the Court's opinion draws upon undue breadth notions). Even in articulating the question before it, the Halliburton Court went astray. The Court thought that it needed to decide whether the
Other courts couched their analyses in terms that, at least to modern observers, tend more towards the rhetoric of patent-eligible subject matter.44 That is, courts might hold that a means expression purporting to cover all means for accomplishing the stated function constituted a claim to an abstraction, thus lying outside the scope of eligible subject matter.45 A Supreme Court decision that created momentum for this line of cases is Corning v. Burden,46 in which the Court limited a patent to the disclosed machine for making “puddler’s balls,” rejecting a broader construction that would have extended the patent to other machines performing essentially the same process, on the ground that the broader construction would give the patentee exclusive rights in a function, in the abstract.47 The traditional

claims at issue “failed to make the ‘full, clear, concise, and exact’ description of the alleged invention required by Rev.Stat. § 4888, 35 U.S.C. § 33 . . . .” Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 2 (1946). The statute, however, provided that this was the role of the written description portion of the specification; the claims needed merely to “particularly point out and distinctly claim the part, improvement, or combination which [the inventor] claims as his invention or discovery.” 35 U.S.C. § 33 (1946). Presumably the Halliburton Court would have struck down the claims anyway even if it had applied the correct statutory standard.


46. Corning v. Burden, 56 U.S. 252, 269 (1853) (noting a patentee “cannot describe a machine which will perform a certain function, and then claim the function itself, and all other machines that may be invented to perform the same function” without risking invalidity). Another early Supreme Court pronouncement on point appears in Fuller v. Yentzer:

Patents for a machine will not be sustained if the claim is for a result, the established rule being that the invention, if any, within the meaning of the Patent Act, consists in the means or apparatus by which the result is obtained, and not merely in the mode of operation, independent of the mechanical devices employed; nor will a patent be held valid for a principle or for an idea, or any other mere abstraction.


47. The celebrated invalidation of claim 8 in O’Reilly v. Morse is perhaps another example. See O’Reilly v. Morse, 56 U.S. 62 (1863). Claim 8 of Morse’s patent read as follows:

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

Id. at 86. Of course, O’Reilly v. Morse can also be viewed as a case about undue breadth. For the observation that the functional claiming cases sound a common theme of concern over undue breadth, and the modern significance of that observation, see infra notes 218-235 and accompanying text.
reluctance to uphold claims in which the sole recited element is a functional expression (often referred to as a "single means" claim) may also derive from concerns about statutory subject matter.48

Typically, courts did not draw any sharp distinction between the eligibility and indefiniteness rationales.49 Unfortunately, this lack of precision was rather commonplace in decisions invoking the functional claiming doctrine.

Given the functional claiming doctrine, as elaborated in some courts, sprang from invalidity or ineligibility doctrines, the consequences of a functional claiming designation could be severe. In some instances, indefiniteness or eligibility concerns lead to the outright invalidation of claims. For example, in Heidbrink v. McKesson, the Sixth Circuit invoked O'Reilly v. Morse in invalidating functional claims:

We are compelled to think that [the claims at issue] are invalid because functional. They are apparently most deliberately and skillfully drafted to cover any means which any one ever may discover of producing the result; that is, to accomplish the one thing while avoiding the other. We think they are clearly to be condemned under the rule stated in O'Reilly v. Morse, . . . and that they are not within the principle of the Telephone Case. . . .50

However, very few courts, if any, viewed invalidity as the inevitable consequence of a determination that a claim was functional. Some courts, even while invalidating the claims before them, acknowledged the possibility of saving a functional claim though a "narrowed" construction.51 That is, the functional claiming

48. For a brief summary of early cases and commentary regarding the proscription against single means claims, see, e.g., DELLER, supra note 1, at § 240, at 700. The proscription was incorporated into § 112, 6, which by its express language authorizes means-plus-function terminology only for claims to "combinations." See also Hofmann & Heller, supra note 45, at 260-61 (briefly explaining the notion of a single means claim).

49. For example, in one case, the Ninth Circuit seemed to invoke both rationales in the same breath:

To permit a patentee to burden his claims by the use of indefinite language would lead to supporting him in a monopoly of a principle or result, which would bar other inventors from arriving at the same result by different means.

Henry v. City of Los Angeles, 255 F. 769, 779 (9th Cir. 1919).

50. Heidbrink v. McKesson, 290 F. 665, 668-69 (6th Cir. 1923). See also Tokheim Oil Tank & Pump Co. v. Dean, 73 F.2d 32, 36 (7th Cir. 1934) (concluding that the means expression at issue "describe[s] nothing but functions, and a function is not patentable"); Tyden v. Ohio Table Co., 152 F. 183, 185 (6th Cir. 1907) (invalidating a claim that contained means expressions because it claimed all means for carrying out the recited function, and therefore was "substantially a claim for a function").

51. See, e.g., Heidbrink, 290 F. at 668-69; Cincinnati Milling Machine Co. v. Turchan, 208 F.2d 222, 225 (6th Cir. 1953); Henry, 255 F. at 779.
doctrines as articulated in these cases derived from a judicial strategy to avoid invalidating claims by imposing a restrictive claim interpretation, thus "interpreting" around the invalidity/ineligibility problem.52

Similarly, a number of courts invalidated functional claims only where the functional expression appeared at the so-called "point of novelty." An early example of the point of novelty qualification to the functional claiming doctrine appears in Davis Sewing Machine Co. v. New Departure Manufacturing Co.53 Rejecting an argument that claims should be invalidated as "functional" whenever the term "means" or the like appeared anywhere in the claim, the court ruled that functional expressions would endanger a claim only when they were used at the exact "point of novelty," and even in this event, the claim could be saved by construing the functional expression narrowly:

[W]here used with reference to the exact point of novelty, 'means' or 'mechanism' may expose the claim to attack on the ground that it is functional; in that respect, each case will present a problem by itself. But where used with reference to the make-up of the field for which the real invention finds its usefulness or with reference to the connecting parts which permit the salient novelty of the invention to accomplish its function, these words are only a convenient formula of the broadest equivalency of which the real invention permits. Their use amounts to a statement by the inventor that, as to this element, the claim is not confined to the form shown, nor to any close imitation of that form, but extends as broadly as is consistent with the extent of his inventive step to all forms accomplishing that part of the ultimate, composite result, and, of course, does not, of itself, prevent the court (where the state of the record requires) from interpreting the claim as limited to a more or less close approximation to the 'means' described in the specification.54

52. It is important to recognize that modern courts would have great difficulty justifying a similar analytic approach — that is, one in which the court departed from the claim language in the name of "interpreting" the claim around an invalidity problem. The then-existing claim construction regime allowed courts much wider latitude to depart from the language of the claims in the name of "interpretation." Certainly, the overarching concept of central claiming supported such departures. See infra notes 86-87 and accompanying text (explaining the central claiming theory in connection with the doctrine of equivalents).

Additionally, courts may also have believed that they were simply applying the patent law canon that the claims will be "interpreted" narrowly if necessary to preserve their validity. See, e.g., DELLER, supra note 1, at § 90, at 182-83 (reciting the canon).


54. Id. at 782-83 (emphasis supplied).
Citing *Davis Sewing Machine Co. v. New Departure Manufacturing Co.*, the Supreme Court articulated a point of novelty analysis for functional claims in *General Electric Co. v. Wabash Appliance Corp.*:

[T]he vice of a functional claim exists not only when a claim is 'wholly' functional, if that is ever true, but also when the inventor is painstaking when he recites what has already been seen, and then uses conveniently functional language at the exact point of novelty.

*Halliburton* was, perhaps, so startling because it departed rather radically from this general trend of referring to the possibility of claim invalidation but then crafted a narrowed construction to save

---

55. General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364 (1938). The claims at issue did not employ means plus function terminology, but used other functional clauses to characterize the claimed product. One of the claims at issue read:

A drawn filament for electric incandescent lamps or other devices, 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.

*Id.* at 368.

56. *Id.* at 371. In other cases, courts achieved the same result, but spoke in terms of limiting the claims to the inventor's "true conception," or the "essence of the invention," to justify the narrowed construction. A case from the Seventh Circuit is representative:

[N]othing is clearer in patent law than that patents are not granted on results, but for the means whereby such results are obtained. Yet, it sometimes is necessary to study the results of an operation in order to ascertain the limitations, and co-acting characteristics, of the elements in the combination— in short, to better construe the language of the claims. Had Benoit's claims so limited his means to describe the particular machine which represented his mental conception, we think no difficulty would have arisen over this question of infringement... we agree with the district court that if validity of the claim is to be recognized the claim must be limited by, and to, the disclosures appearing in the specifications and drawings.

Benoit v. Wadley Co., 54 F.2d 1041, 1044 (7th Cir. 1932). See also Morley Co. v. Lancaster, 129 U.S. 263, 286 (1889); *Henry*, 255 F. at 769 (use of "means" language in reference to the "essence of the invention" would be unacceptable unless the language were construed to cover "only those [means] which are shown in the patent and their equivalents"). Cf. Tokheim Oil Tank & Pump Co. v. Dean, 73 F.2d 32, 36 (7th Cir. 1934) (citing the same treatise passage, but leaving unclear whether a narrowed construction could save a claim that used "means" language in reference to the "essence of the invention").

Whether concepts such as the point of novelty, the "essence of the invention," or the like have any merit generally for utility patents is a proposition worth exploring. The Federal Circuit continues to speak of the "point of novelty" in various contexts, although at least in the obviousness context it has rejected the notion of the "heart of the invention." See, *e.g.*, Para-Ordnance Mfg. v. SGS Importers Int'l, Inc., 73 F.2d 1085, 1087 (Fed. Cir. 1995) (explaining that in the obviousness analysis, the court must consider the claimed subject matter as a whole; there is no legally cognizable "heart of the invention"); W.L. Gore & Assocs., Inc. v. Garlock, 721 F.2d 1540, 1551, 1553 (Fed.Cir. 1983).
the claim. *Halliburton* seemed to move the functional claiming doctrine unequivocally in the direction of a rule of invalidity, rather than predominantly a rule of claim interpretation. Based on the *Halliburton* decision, it appeared that if a claim used a functional expression at the "point of novelty," the claim would not merely be construed narrowly; it would be held invalid as indefinite. The focus of functionality analysis shifted to whether the functional expression resided at the "point of novelty." Among other things, this cast considerable uncertainty over the dimensions of the functionality doctrine, given the tremendous elasticity of the point of novelty concept. At another level, it may

---

57. In *Halliburton*, the Court found that the patentee had used a means expression to describe the "most crucial element" in the claimed combination. *Halliburton* Oil Well Cementing Co. v. Walker, 329 U.S. 1, 9 (1946).

58. Some courts apparently assumed, without analyzing the matter in depth, that even *Halliburton*, a narrowed construction could still save a claim that used a functional expression at the point of novelty:

> We have held that where the novelty that exists in a combination of elements set forth in the claim, resides in the means, the claim must be limited to such means as are disclosed and illustrated in the specification. An inventor cannot by the mere use of the word 'means' appropriate any and all kinds of mechanism which may perform the specified function or any other mechanism or device than that which is described in the patent or which is its mechanical equivalent.

Cincinnati Milling Machine Co. v. Turchan, 208 F.2d 222, 225 (6th Cir. 1953). Cf. S.D. Warren Co. v. Nashua Gummed & Coated Paper Co., 205 F.2d 602, 605 (1st Cir. 1953) (stating that while courts have "repeatedly held" that functional expressions might run afoul of definiteness requirements, this rule does not forbid all functional expressions, but rather forbids "the description of the 'crucial element' of a claim in terms of accomplishment rather than in terms of physical characteristics; it forbids a statement of function or result at the precise point of novelty").

59. Indeed, the *Halliburton* Court attempted to explain away the *Continental Paper Bag* decision on the basis of the point of novelty criterion. While the point of novelty in *Halliburton* supposedly lay solely in one of the claim elements that the patentee had expressed functionally, the point of novelty in *Continental Paper Bag* lay in the "physical and operating relationships" of all of the parts of the combination, and the patentee had used structural language to specify those relationships. *See Halliburton*, 329 U.S. at 12-13; Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405, 420-22 (1908).

60. The Supreme Court’s terse opinion in *Faulkner* v. *Gibbs* illustrates the point rather graphically. The Court took the case on certiorari to consider whether the lower court’s ruling upholding the patent claims at issue conflicted with *Halliburton*. *See Faulkner* v. *Gibbs*, 338 U.S. 267 (1949). The Court summarily dismissed the argument that there was any conflict:

> We there [in *Halliburton*] held the patent invalid because its language was too broad at the precise point of novelty. In the instant case, the patent has been sustained because of the fact of combination rather than the novelty of any particular element.

*Id.* at 267-68. But the same could be said of any "combination" claim, suggesting that courts that were so inclined could have easily circumvented *Halliburton* at their whim. Federal Circuit case law now makes this argument clear, emphatically rejecting the notion of a separate class of "combination" claims. For example, in *Medtronic, Inc.* v. *Cardiac Pacemakers, Inc.*, 721 F.2d
have created uncertainty as to whether the functional claiming doctrine was in fact a strategy of claim construction for avoiding invalidity/ineligibility problems, or simply an invalidity/ineligibility doctrine itself.

C. The Disclosure-Plus-Equivalents Restriction as a Central Claiming Strategy

In addition to employing the “functionality” doctrine as a reaction to perceived invalidity problems, in many cases the invocation of functionality derived directly from then-existing doctrines of claim construction and claim scope. At least three rationales oriented to claim interpretation emerge from the cases: a rule of “strict” construction of combination claims; the general application of central claiming principles to import detail into the claim from the disclosure; and, most importantly, the application of the doctrine of equivalents as it was understood in the context of the central claiming regime. In many cases, courts commingled these rationales.

1. “Strict” Construction of Combination Claims

Some cases illustrate that the functionality doctrine has as one of its progenitors a rule of construction that strictly limited the scope of “combination” claims. For example, in Portland Gold Mining Co. v. Hermann, involving interpretation of the expression “means for spraying water upon the ore as it passes downwardly over the perforated plate to the table,” the court relied upon general principles holding that combination claims would be given a restrictive construction:

In a combination device consisting in congeries of well-known mechanical appliances, no liberality of construction is accorded to

---

1563, 1566 (Fed. Cir. 1983), the court acknowledged that nearly any patent claim could be characterized as a claim to a combination of old elements, and asserted that

"[t]here is neither a statutory distinction between "combination patents" and some other, never defined type of patent, nor a reason to treat the conditions for patentability differently with respect to "combination patents". It but obfuscates the law to posit a non-statutory, judge-created classification labeled "combination patents".

Id.

Not surprisingly, the author of the Halliburton opinion dissented, albeit in a single sentence. See id. ("Mr. Justice Black is of the opinion that the language of the claims was too broad at the precise point where there was novelty, if there was novelty anywhere.").

62. Id. at 94.
it to create a monopoly; but it is limited to the descriptive elements in the combination as expressed in the specifications; and no great liberality of the doctrine of mechanical equivalents can be indulged in its favor. As the applicant for such combination of old devices chooses his own expressions in presenting it, and is required to enumerate the elements of his claim, he is limited to the combined apparatus as specified.\footnote{Id. at 99.}

Similarly, in Hollingshead Co. v. Bassick Manufacturing Co., the court appeared to draw upon a bias against combination claiming to derive a disclosed structure plus equivalents rule for functional claims:

The exact question is the proper interpretation to be given to the word ‘means’ and the language immediately following.... The rule is, therefore, that the scope of a patent upon a combination should be limited to the specific devices described or their mechanical equivalents. Applying these principles to claims 14 and 15, it must be held that the interpretation of the words ‘means co-acting with the ends of said pin for detachably connecting the discharge end of said conduit with said grease cup’ should be in the light of the drawings and specification.\footnote{Hollingshead Co. v. Bassick Mfg., 73 F.2d 543, 547-48 (6th Cir. 1934); see also Halliburton, 329 U.S. at 10 (noting that “courts have viewed claims to combinations and improvements or additions to them with very close scrutiny”).}

Hollingshead Co. v. Bassick Manufacturing Co. builds on an interesting early case, Dudley E. Jones Co. v. Munger Improved Cotton Machine Manufacturing Co.\footnote{Dudley E. Jones Co. v. Munger Improved Cotton Mach. Mfg., 49 F. 61 (5th Cir. 1891).} There, certain of the claims at issue recited “means for delivering the cotton from the conveyor to the gin.”\footnote{Id. at 62 (reciting claims 1 and 2).} Reviewing a model of the patentee’s device embodying

---

\footnote{Id. at 99.}
\footnote{Hollingshead Co. v. Bassick Mfg., 73 F.2d 543, 547-48 (6th Cir. 1934); see also Halliburton, 329 U.S. at 10 (noting that “courts have viewed claims to combinations and improvements or additions to them with very close scrutiny”).}
\footnote{Dudley E. Jones Co. v. Munger Improved Cotton Mach. Mfg., 49 F. 61 (5th Cir. 1891).}
\footnote{Id. at 62 (reciting claims 1 and 2).}
the invention, the court articulated the following infringement framework:

In the model presented in the evidence, the same device that was declared in the design, specification, and claim was shown, and we consider that he must be held to such a device or means, and not be permitted to extend his claim to anything of a different character or description. . . . Has the defendant adopted, used, and sold a machine containing such device or any equivalent to it in the means used for conveying the cotton from the chamber to the gin?67

That the court thought it was applying a general rule as to combinations is evident from the following language:

In combinations, the doctrine of equivalents is construed most strongly against him who alleges an infringement, and each party is held to his own element or device, or a positive and exact equivalent which performs the same functions, in the same manner, the burden being on the complainant to show this.68

Here, the fear of functional expressions is resolved into a general fear of combination claims. Modern courts take a more charitable view of combination claims, an observation which may prove to be of value for purposes of the sort of normative assessment of § 112, ¶ 6 that would be useful in considering legislative reform.69

2. Functional Claiming Doctrine as a Straightforward Application of Central Claiming Principles

In other cases, courts justified narrow interpretations of functional expressions merely on the basis of the express claim language or on background principles of central claiming. Under the central claiming theory, patent claims constituted merely an exemplary definition of the invention; the court was free to look to the entirety of the specification to define the scope of the invention.70

67. Id. at 65.

68. Id. at 67. Interestingly, in defining what constituted an “equivalent” for purposes of this test, the court relied upon familiar doctrine of equivalents formulations. Id. at 66 (“The general principle is that, in order to be considered an equivalent of another, one device must perform the same functions, and perform them in substantially the same way . . .”).

69. I take this up in Part VI.

70. See, e.g., TOSHIO TAKENAKA, INTERPRETING PATENT CLAIMS: THE UNITED STATES, GERMANY, AND JAPAN 6-9 (1995) (explaining the central claiming theory and contrasting the peripheral claiming theory). For a succinct Supreme Court statement of then-existing claim construction rules reflecting the central claiming theory, see, for example, Fuller v. Yentzer, 94 U.S. 288, 288 (1876) (“Where the claim immediately follows the description of the invention, it may be construed in connection with the explanations given in the description;
Patent lawyers at the time frequently included so-called “back-firing” expressions such as “substantially as herein described” or the like in claims.\(^{71}\) Back-firing expressions in one sense restricted the claim by acknowledging that limitations from the specification might well be read into the claim, consistent with the court’s application of central claiming principles. On the other hand, such expressions reflected the patentee’s intent to have the claim encompass more than merely that which was explicitly disclosed in the specification.\(^{72}\) The resultant claim scope, then, at least theoretically, was something narrower than the literal scope of the claims might indicate but broader than the preferred embodiment described in the written description portion of the specification.

Accordingly, a court applying these principles to a functional expression might well read the expression to cover only the means disclosed in the specification for accomplishing the claimed function, along with other means substantially similar to the disclosed means. A good early example is *Union Match Co. v. Diamond Match Co.*\(^{73}\) There, the claim at issue included the functional expression “means for giving the box a to and from jarring motion, in a direction out of a vertical line, and substantially at right angles to the matches as they are to lie in the box, substantially as and for the purpose specified.”\(^{74}\) The court rejected a construction of this claim that allowed the means expression to encompass “all possible means for accomplishing the result,”\(^{75}\) and instead applied a narrowed construction:

> The claims in question by direct terms refer to the specification for the means by which the function, purpose, or object of the invention is to be accomplished, and to that we must look for them.\(^{76}\)

Even where the claim included no express “back-firing” expression, it is quite possible that courts were applying the background principles of central claiming in any event.\(^{77}\) In

\(^{71}\) See *DELLER*, supra note 1, at §§24-25 for a brief explanation of “back-firing” expressions.

\(^{72}\) See *TAKENAKA*, supra note 70, at 9.

\(^{73}\) *Union Match Co. v. Diamond Match Co.*, 162 F. 148 (8th Cir. 1908).

\(^{74}\) *Id.* at 150.

\(^{75}\) *Id.* at 152 (explaining that “such comprehensiveness of claim would not be patentable.”).

\(^{76}\) *Id.* at 152.

\(^{77}\) Indeed, this observation ties together many of the cases using the functional claiming doctrine as a claim construction strategy.
Hollingshead Co. v. Bassick Manufacturing Co., for example, the court, in the course of interpreting a functional expression, made clear that

Claims must be interpreted in the light of specifications as though the words ‘substantially as described’ were incorporated in each claim and should be limited to this contribution, which is the invention disclosed by the patent.78

Here, too, there are implications for a modem understanding of § 112, ¶ 6, because these cases reveal that § 112, ¶ 6 is founded at least in part on approaches to claim construction that have long since been discarded.79

3. Functional Claiming Doctrine and the Doctrine of Equivalents in Its Central Claiming Incarnation

It is clear that in a number of early cases applying a structure-plus-equivalents restrictive interpretation to functional expressions, courts thought that they were simply applying the doctrine of equivalents. For example, in one Sixth Circuit case, the court remarked that

There was doubtless recognition here that if the claim were construed so as to include all means for maintaining a slidable connection, it was too broad, and that the only safe ground upon which to base infringement was the doctrine of equivalents.80

Earlier Supreme Court cases seemed to lay the groundwork for this view. In Continental Paper Bag v. Eastern Paper Bag Co., the Court characterized its infringement analysis of the means expression at issue as an application of the doctrine of equivalents.81

78. Hollingshead Co. v. Bassick Mfg., 73 F.2d 543, 546 (6th Cir. 1934).
79. I explore the anachronistic nature of § 112, ¶ 6 in more detail in Part VI.
80. Chicago Forging & Mfg. v. Bade Cummings Mfg., 63 F.2d 928, 930 (6th Cir. 1933). The court proceeded to observe that “[o]bviously . . . the patentee was not entitled to claim all structures which exercised the desired function, but only those which he himself invented.” Id. at 930-31. Earlier Sixth Circuit cases to the same effect include Davis Sewing Machine Co. v. New Departure Manufacturing, 217 F. 775, 782-83 (6th Cir. 1914) (means expressions “are only a convenient formula of the broadest equivalency of which the real invention permits”); Jackson Fence Co. v. Peerless Wire Fence Co., 228 F. 691, 699 (6th Cir. 1915) (same). See also Auditorium Ventilating Corp. v. Greater Rochester Properties, Inc., 59 F.2d 450, 457 (W.D. N.Y. 1929) (refusing to interpret the means expression at issue to cover all means for performing the recited function, and instead employing “a limited application of the doctrine of equivalents” which adequately “affords plaintiff protection for his discoveries”).
81. See Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405, 421 (1908) (framing the infringement inquiry as follows: “Under all the circumstances of the case, is the [accused machine] within the doctrine of equivalents?”).

The functional claiming doctrine and its apparent connection to the doctrine of
directly, in *Hildreth v. Mastoras*, the Court expressed the view that the disclosure-plus-equivalents construction of functional expressions also appear prominently in the well-known opinion in *Boyden Power-Brake Co. v. Westinghouse*, 170 U.S. 537 (1898). The claims at issue did not contain means expressions, but, according to the Court, were "to a certain extent, for a function..." *Id.* at 554. The Court was referring to claim 2 of the patent-in-suit, which read:

In a brake mechanism, the combination of a main air pipe, an auxiliary reservoir, a brake cylinder, and a triple valve having a piston whose preliminary traverse admits air from the auxiliary reservoir to the brake cylinder, and which by a further traverse admits air directly from the main air pipe to the brake cylinder, substantially as set forth.

*Id.* at 543 (reproducing the text of the claims). The Court recognized the argument that the claim was merely for the function of admitting air directly from the train pipe to the brake cylinder, "and is only limited to such function when performed by the further traverse of the piston of the triple valve." *Id.* at 554. Rejecting a construction that would have rendered the claim invalid as merely reciting a function, the Court appeared to apply a disclosure-plus-equivalents construction to claim 2:

If the second claim be not susceptible of the interpretation that it is simply for a function, then the performance of that function must be limited to the particular means described in the specification for the admission of air from the train pipe to the brake cylinder... This raises the same question which is raised under the first and fourth claims, — whether defendants' device contains the auxiliary valve of the Westinghouse patent, or its mechanical equivalent.

*Id.* at 557. In so determining that it must read the limitations of the specification into the claim in order to avoid a validity determination, the Court could also rely on the presence of the "back-firing" expression “substantially as set forth.” *Id.* at 558.

In a later section of the opinion directed at claims 1 and 4, the Court set out the rule that has become known as the "reverse" doctrine of equivalents:

The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent.

*Id.* at 568. It was clear that here, too, the Court was applying a disclosure-plus-equivalents rule, based upon the presence of the back-firing expression:

Under the very terms of the Westinghouse patent, the infringing device must not only contain an auxiliary valve, or its mechanical equivalent, but it must contain the elements of the combination, 'substantially as set forth.' In other words, there must not only be an auxiliary valve, but substantially such a one as is described in the patent...

*Id.* at 569. Significantly, the Federal Circuit has seized on the "reverse doctrine of equivalents" as set forth in *Boyden* as a doctrinal antecedent to § 112, ¶ 6 equivalency, without recognizing the more telling underlying connections between the doctrine of equivalents and § 112, ¶ 6 equivalency. *See*, e.g., *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 (Fed. Cir. 1989) ("Properly understood section 112 P 6 operates more like the reverse doctrine of equivalents than the doctrine of equivalents because it restricts the scope of the literal claim language."); *see also Valmont Indus. v. Reinke Mfg.*, 983 F.2d 1039, 1042 (Fed. Cir. 1993) ("[§ 112, ¶ 6] operates more like the reverse doctrine of equivalents than the doctrine of equivalents because it restricts the coverage of literal claim language.").

was merely an instance of the application of the doctrine of equivalents, as that doctrine was then articulated. In *Hildreth v. Mastoras*, the claim at issue called for a candy-pulling machine including “means for producing a specified relative in-and-out motion of these parts for the purpose set forth.”\(^8\) The Court declared that it was applying the “doctrine of broad equivalents,” and found infringement notwithstanding the fact that the accused device differed from the precise embodiment disclosed in the specification.\(^4\) Even *Halliburton* itself contains some cryptic references to the doctrine of equivalents.\(^5\)

Although this version of the doctrine of equivalents involved measuring equivalents to the disclosure, rather than to the claim,\(^6\) the meaning of “equivalency” was the same as that used today under the modern doctrine of equivalents.\(^7\) Thus, for example, the First Circuit in *Buono v. Yankee Maid Dress Corp.*, construing a means expression\(^8\) by application of the disclosure-plus-equivalents rule, referred to a “function-means-result” formulation for equivalency:

> [The means expression] too is readily enough identified by the disclosure, and though it does speak in terms of function that is inevitable to some degree, if the claim is to have any generality whatever. The very test of equivalency is in terms of function, ‘the same result by the same means’; and it is only by recourse to that

---

83. Id. at 32.
84. Id. at 36.
85. *See, e.g.*, Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 12 (1946) (“Yet if Walker’s blanket claims be valid, no device to clarify echo waves, now known or hereafter invented, whether the device be an actual equivalent of Walker’s ingredient or not, could be used in a combination such as this . . . .”); id. at 10 (“[C]ourts have qualified the scope of what is meant by the equivalent of an ingredient of a combination of old elements . . . .”).

At least some scholars at the time appreciated that the *Halliburton* decision had implications for the doctrine of equivalents as applied to functional claims. *See, e.g.*, Irons, *supra* note 23, at 168 n.9 (“The Halliburton decision also raises a serious question relative to the proper scope of equivalents which may be afforded an element in a combination claim.”). Irons goes on to argue that the Supreme Court’s post-*Halliburton* decision in *Faulkner v. Gibbs*, 338 U.S. 267 (1949) “restore[s] the concept of equivalency as applied to the substitution of elements in combinations to the pre-*Halliburton* status.” Irons, *supra* note 23, at 172. This seems a bit strong, given that *Faulkner*, by its own terms, can be explained as an application of the “point of novelty” rule.

86. This, of course, is an artifact of central claiming theory. *See supra* note 70 and accompanying text for a brief discussion of the central claiming theory.
88. The functional expression at issue was “operating means connected to said eccentric device and turning said pivoted device at predetermined intervals.” *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 277 (2d Cir. 1935).
standard that a patentee can pass beyond the very details of his disclosure. Some such latitude being necessary, it is only a question of how far the functional element is anchored in the disclosure, and how far it floats as a vague threat to the art. That is a question of degree, and admits of no general solution, for the mere use of the word 'means' does not condemn a claim.\textsuperscript{89}

Other cases state directly that "established rules on the subject" of equivalency apply.\textsuperscript{90}

Indeed, that courts were applying the established rules flowing from the doctrine of equivalents is further evidenced by cases invoking the pioneering invention doctrine.\textsuperscript{91} For example, in one case, the Court of Customs and Patent Appeals invoked the notion of the pioneering invention to justify according a range of equivalents to a means expression:

It is a general rule that one may not claim all means of doing a thing by a broad means limitation and thereby throttle and prevent future inventive efforts in the line of improving such means of doing the particular thing. However, to this general rule there are certain exceptions. There are certain instances where the invention is so revolutionary in a pioneering field as to furnish examples of the exception to said general rule.\textsuperscript{92}

In another case illustrating a similar approach, a court determined that the claimed invention was \textit{not} a pioneering invention, and on that basis applied a disclosure-plus-equivalents construction.\textsuperscript{93}

\begin{flushleft}
\textsuperscript{89} Id. at 277. The court proceeded to apply the rule that means expressions could not be used at the point of novelty. See id. at 277-78 ("In the case at bar the [means] phrase was justified because the invention did not reside in the mechanical train connecting the eccentric with the table . . . .").

\textsuperscript{90} [Functional language] will not include all means, mechanism, or devices which can perform that function, but only those which are shown in the patent and their equivalents. And in this case, also, the question whether other means, mechanism, or devices are equivalents to those shown in the patent will be determined by the established rules on that subject . . . .

\textsuperscript{91} Henry v. City of Los Angeles, 255 F. 769, 779 (9th Cir. 1919).

\textsuperscript{92} In re Smellie, 111 F.2d 651, 652 (C.C.P.A. 1940).

\textsuperscript{93} United Shoe Mach. Co. v. L.Q. White Shoe Co., 279 F. 35 (1st Cir. 1922). Noting the non-pioneering status of the claimed invention, the lower court had "concluded that 'the broad and general language of the claims, 'means for clinching the barrel of the eyelet upon the lining beneath the outer portion of the upper,' should be restricted to the means described in the
Finally, the legislative history pertinent to § 112, ¶ 6, although very sparse, also supports the view that § 112, ¶ 6 equivalency is linked to the doctrine of equivalents.\(^4\) This alone has significant implications for modern application of the § 112, ¶ 6 equivalency concept.

Unfortunately, as detailed in the following Parts, modern courts seem to take little guidance from pre-1952 case law on functional claiming, instead imposing a wholly unnecessary layer of complicating rules that should be reformed.

### III. FUNCTIONAL EXPRESSIONS AND THE LITERAL INFRINGEMENT ANALYSIS

The historical synthesis in Part II seeks to demonstrate, among other things, that § 112, ¶ 6 was not a novel statutory contrivance, but rather was derived from a considerable body of case law. To be certain, the rules enumerated in that case law are not terribly precise, and may even be criticized as archaic. This may make the case for a legislative overhaul of § 112, ¶ 6, an argument that I take up in Part VI.

On the other hand, the pre-1952 case law does provide lessons for the modern application of § 112, ¶ 6. For example, the case law clearly indicates a link between § 112, ¶ 6 equivalency and the doctrine of equivalents. However, aside from some passing acknowledgments, the law of § 112, ¶ 6 equivalents as enunciated by the Federal Circuit has come largely unmoored from its pre-1952 antecedents.\(^5\) The principal evidence of this phenomenon is the rise

---

\(^4\) Congressman Joseph R. Bryson declared, in an address that was made part of the Congressional Record, that the new section 112 “will give statutory sanction to combination-claiming as it was understood before the Halliburton decision. All the elements of a combination now will be able to be claimed in terms of what they do as well as in terms of what they are.... This provision also gives recognition to the existence of the doctrine of equivalents.” See 98 CONG. REC. A415, 82d Congress 2d Sess. 1952, cited in Robert S. Smith, Functional Claims and the Patent Act of 1952, 48 J. PAT. OFF. Soc’Y 426, 432 (1966). See also id. at 432-36 (discussing relevant portions of the legislative history).

\(^5\) The Supreme Court, at least, has recently made passing reference to the connection between § 112, ¶ 6 equivalents and the doctrine of equivalents, noting in Warner-Jenkinson that the reference to “equivalents” in § 112, ¶ 6 could be taken as “an application of the doctrine of equivalents in a restrictive role, narrowing the application of broad literal claim elements.”
of the concept of "structural equivalency" to describe the nature of the § 112, ¶ 6 equivalents inquiry. The first step in reforming § 112, ¶ 6 jurisprudence, using pre-1952 antecedents as a guide, is to expunge the concept of structural equivalents from the law.96

To its credit, the Federal Circuit has clearly delineated § 112, ¶ 6's impact on the literal infringement prong of the modern bipolar infringement regime. In numerous opinions, the court has declared that to satisfy literally a means-plus-function expression, an accused device must "perform the identical function as that identified in the means clause and do so with structure that is the same as or equivalent to that disclosed in the specification."97

This construction, of course, creates the apparent anomaly of an equivalency concept residing within a literal infringement analysis. Quite reasonably, the Federal Circuit anticipated that lower courts might erroneously assume that the effect of § 112, ¶ 6 is to conflate the literal infringement and doctrine of equivalents regimes for means expressions. The Federal Circuit has taken great pains to guide the judiciary away from this course. In Valmont Industries Inc. v. Reinke Manufacturing Co., for example, the court insisted that § 112, ¶ 6 and the doctrine of equivalents "have separate origins and purposes,"98 an understanding which is periodically repeated in Federal Circuit opinions.99 The court has erected a firewall between the literal infringement framework that applies to means expressions and the doctrine of equivalents framework that applies to all types of expressions.

Unfortunately, these zealous efforts to maintain the integrity of


96. That is, the Federal Circuit should recognize that all equivalents are created equivalent — specifically, that § 112, ¶ 6 equivalents share common characteristics and heritage with equivalents under the doctrine of equivalents, as detailed in this Part.


98. Valmont, 983 F.2d at 1043. As the court elaborated, "[s]ection 112, ¶ 6 limits the broad language of means-plus-function limitations in combination claims to equivalents of the structures, materials, or acts in the specification. The doctrine of equivalents equitably expands exclusive patent rights." Id. For a criticism of this assertion, see Janis, supra note 7, at 212-16, 225.

99. See, e.g., Endress + Hauser, Inc. v. Hawk Measurement Sys. Pty. Ltd., 122 F.3d, 1040, 1043 (Fed. Cir. 1997) ("[i]t is well understood that 'equivalents' under section 112 paragraph 6 is a different concept from 'equivalents' under the judicially created doctrine of equivalents . . . ."); Alpex Computer Corp. v. Nintendo Co., 102 F.3d 1214, 1222 (Fed. Cir. 1996) ("While equivalency under the doctrine of equivalents and equivalency under § 112, ¶ 6, both relate to insubstantial changes, each has a separate origin, purpose and application.");
the bipolar infringement regime by pointing to differences in the respective infringement frameworks seem to have inspired the belief that there must necessarily be meaningful differences in the respective underlying equivalency concepts. The Federal Circuit has, over the past several years, verbalized this supposed distinction between equivalency concepts by referring to § 112, ¶6 equivalents as "structural" equivalents.

The root of all confusion over § 112, ¶6 equivalency may well lie here, with the emergence of the unproductive, and ultimately misleading, concept of "structural" equivalency. As I outline below, the first step in reforming the Federal Circuit's § 112, ¶6 jurisprudence should be to banish the concept of structural equivalency. The second should be to recognize the relevancy of Graver Tank & Manufacturing v. Linde Air Products and Warner Jenkinson Co. v. Hilton Davis Chemical Co. concepts of equivalency to the § 112, ¶6 determination, under the general principle that all equivalents are created equivalent.

A. Banishing "Structural Equivalency" from § 112, ¶6 Jurisprudence

The text of § 112, ¶6 does not refer to "structural equivalents." It speaks of "the corresponding structure, material, or acts described in the specification and equivalents thereof." Observing this, some judges, including Judge Rich, have voiced a fundamental, text-based objection to the concept of structural equivalency.

100. See Dawn Equip. Co. v. Kentucky Farms, Inc., 140 F.3d 1009, 1018 (Fed. Cir. 1998) (Plager, J., additional views) (pointing out that the existing approach to § 112, ¶6 equivalency seems to assume that "there are clearly defined operational differences" between doctrine of equivalents equivalency and § 112, ¶6 equivalency, and that "triers of fact... can readily differentiate them").

101. Some commentators have followed suit. See, e.g., Kenneth R. Adamo, Reconciling Section 112, Paragraph 6 Literal Equivalents with the Doctrine of Equivalents in the Wake of Hilton-Davis, in PLI's THIRD ANNUAL INSTITUTE FOR INTELLECTUAL PROPERTY LAW at 291, 306 (PLI Patents, Copyrights, Trademarks, and Literary Course Handbook Series No. G4-4008, 1997) ("A § 112, ¶6 literal, 'structural' equivalent, is simply a different animal than what one finds under the doctrine of equivalents.").

102. DeGraffenried v. United States, 20 Cl.Ct. 458, 479 (1990): [T]he term "equivalent" in Section 112 should not be interpreted as being limited to structures that are "equivalent" to the physical structure of the "means" disclosed in a patent. The literal wording of Section 112 contains no such requirement. The statute merely refers to structures "described in the specification and equivalents thereof." It does not state that the only possible "equivalents" to the structures described in the specification are devices with equivalent physical structures, i.e., it does not provide structures "described in the specification and structural equivalents thereof."
Although textual analysis of § 112, ¶ 6 is chancy at best, this absence of any crystal clear textual foundation for the structural equivalency rubric raises certain doubts about the Federal Circuit's ready adherence to structural equivalency. A brief glance at historical practice only intensifies these doubts. Structural equivalency has remarkably shallow roots in U.S. patent law. Prior to the Federal Circuit era, courts referred to structural equivalency only rarely and in passing, and never, insofar as I have been able to determine, in the context of § 112, ¶ 6 determinations.

Within the means-plus-function context, the structural equivalency concept is essentially a child of the 1990's. Judge Nies referred to structural equivalency in an influential opinion,


I can agree with the majority's generalized statement that to meet a means-plus-function limitation an accused device must perform the function named in the means clause "and perform that function using the structure disclosed in the specification or an equivalent structure." ... That is what section 112 paragraph 6 says. But that does not necessarily mean that a structural equivalent of what the specification discloses must be used. The two emphasized expressions sound very similar but they connote very different concepts and should not be confused.

*Baltimore Therapeutic, 1994 WL 124022 at *6 (Rich, J, concurring).*

103. The phrase "structural equivalent" or variations thereof appears only very infrequently in U.S. patent cases prior to the Federal Circuit era, and never, insofar as I have been able to determine, in the context of § 112, ¶ 6. Instead, the phrase is applied loosely (and perhaps improperly) in a handful of cases on obviousness. See, e.g., Chiplets, Inc. v. June Dairy Prods., 114 F. Supp. 129, 132-33 (D. N. J. 1953) ("When these claims are thus construed the complete absence of patentable invention is evident. The alleged invention comprises nothing more than an assemblage of old elements, or their structural equivalents, in a combination in which they perform no new or different function. It is well established that such an assemblage is not a patentable invention."); see also *In re Ruff*, 256 F.2d 590, 599 (C.C.P.A. 1958) (referring to a PTO obviousness argument urging "the existence of an actual art-recognizable 'structural' equivalence between the prior art amino compounds and the claimed mercapto compounds, over and above any implied admission of such equivalence due to inclusion in a Markush group or expressly admitted functional equivalence"). Interestingly enough, the term also shows up on rare occasions in reference to the doctrine of equivalents. Reese v. Elkhart Welding & Boiler Works, Inc., 447 F.2d 517, 527 (7th Cir. 1971) ("Infringement exists if the accused device is the structural equivalent of the device described in a patent, and performs substantially the same function, in substantially the same way, to achieve the same results, even though it differs in form or shape.").

104. There is a rather oblique reference to structural equivalence in Texas Instruments, Inc. v. United States Int'l Trade Comm'n, 846 F.2d 1369, 1370 (Fed. Cir. 1988) ("Texas Instruments (TT) again asserts that because its Patent No. 3,819,921 describes a 'pioneer' invention the claims should be given an enhanced breadth of interpretation, such that the extensive technological changes that have occurred since this invention was made should be deemed not only functional equivalents but also structural equivalents in terms of 35 U.S.C. § 112 ¶ 6.").
Johnston v. IVAC:

[For a means-plus-function limitation to read on an accused device, the accused device must incorporate the means for performing the function disclosed in the specification or a structural equivalent of that means, plus it must perform the identical function. Section 112 P 6 can never provide a basis for finding that a means-plus-function claim element is met literally where the function part of the element is not literally met in an accused device.105

Unfortunately, the unquestioning usage of the structural equivalency rubric in connection with § 112, ¶ 6 equivalency has now become the rule in Federal Circuit and District Court opinions.107

But it is important to understand that structural equivalency is the product of the nearly instantaneous absorption of Federal Circuit dicta into U.S. patent law, not the product of any carefully considered historical evolution that might warrant special allegiance.

While the structural equivalency rubric draws little or no support from text or history, it enjoys even less justification as a conceptual matter. This is the principal failing of structural equivalency: it is conceptually empty.108

A crucial flaw in the concept of structural equivalency is that it seems to demand an equivalency comparison that focuses exclusively on physical structure.109 The result, in many cases, is a particularly

109. The Federal Circuit's statements in Alpex seem to reflect this rigid adherence to assessing equivalency of physical structure. The court insisted that the patentee's expert
cramped form of equivalency analysis that provides the patentee an unduly restrictive literal claim scope, at best. Where § 112, ¶ 6 equivalency extends only to physically “equivalent” structure, it seems likely that competitors can avoid the literal scope of the claim merely by substituting structure that differs physically from the structure disclosed in the specification, even if the substituted structure is a known variant of the disclosed structure, performs the same function as the disclosed structure, and yields the same result as the disclosed structure.110 A patentee attempting to escape this outcome would seem to confront equally unpalatable choices: either to abandon the means terminology altogether, or to disclose explicitly all known structures for performing the function called out in the means clause.111

But this simply cannot be what Congress had in mind when it injected an equivalency concept into § 112, ¶ 6. The very notion of equivalency under § 112, ¶ 6 is rendered meaningless if the patentee must explicitly disclose known “equivalents.” Such a construction effectively reads the equivalency notion out of the statute. Moreover, as the historical synthesis plainly shows, there has long been a link between the doctrine of equivalents (as understood in a central claiming regime) and the “equivalents” available under a “structure plus equivalents” construction of a functional expression.112

Furthermore, this interpretation of § 112, ¶ 6 equivalency does not square with the prevailing understanding that § 112, ¶ 6 was

---

10. Limiting literal infringement of “means plus function” claims to objects that have physical structure equivalent to those objects specifically described in the patent specification could seriously undermine the usefulness of such claims. Under such an interpretation, literal infringement of a claim may be avoided simply by replacing the structures specifically described in the patent specification with known functional equivalents that operate in substantially the same way but have fundamentally different structures.

DeGraffenried, 20 Cl.Ct. at 480.

11. See id. at 481 (in order to escape the strictures of structural equivalency, “a patent owner would reasonably have to include in the patent specification an exhaustive list of structures that possibly could perform each function described in the claim”).

12. See supra Part II.C.
intended as a response to *Halliburton*. In *Halliburton*, the Supreme Court seemed bent on placing an extremely high price tag on the use of means expressions: such expressions would apparently render a claim invalid unless the patentee expressly disclosed all alternative means for performing the function recited in the means plus function clause. Congress, through § 112, ¶ 6, refused to limit the literal reach of means expressions so severely, declaring that means expressions would cover the corresponding disclosed structure and equivalents thereof. The § 112, ¶ 6 equivalency concept is, of course, the key to Congress's compromise. To the extent that courts restrict § 112, ¶ 6 equivalency nearly out of existence, courts come very close to reading § 112, ¶ 6 as reinstating *Halliburton*, not responding to it.

Additionally, the rigid version of equivalency prompted by the "structural equivalency" label is at odds with accumulated learning on the operation of equivalency notions in U.S. patent law, which views equivalency as a flexible tool for advancing "general fairness." Structural equivalency, in short, renders equivalency "the prisoner of a formula," and thus runs at odds with accepted judicial pronouncements as to the nature of equivalency as developed in connection with the doctrine of equivalents.

Finally, the structural equivalency rubric is conceptually empty because it seems to operate primarily as a cover for *a priori* conclusions of no equivalency. This seems particularly evident given that nearly any minute change in structural geometry seems to be sufficient to preclude any finding of structural equivalency. Judge

---


114. *See Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 11 (1946) (criticizing the patentee because "[n]either in the specification, the drawing, nor in the claims... was there any indication that the patentee contemplated any specific structural alternative for the acoustical resonator... ").


116. *See, e.g.*, *Graver Tank & Mfg. v. Linde Air Prods.*, 339 U.S. 605, 609 (1950) ("Equivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum.").

117. In *Chiuminatta*, the alleged infringer argued that for an accused structure to be equivalent to a disclosed structure in the § 112, ¶ 6 sense, the accused structure "must include substantially all of the structured features" of the disclosed structure. *Chiuminatta Concrete...
Rich offers a lucid illustration demonstrating how the structural equivalency concept falters in even the simplest of technological contexts. The illustration poses a question that seems almost embarrassingly simple and mundane: what is the "structural equivalent" of a nail? The question would arise, for example, in a literal infringement analysis of a claim that recited a part A, another part B, and "means for securing parts A and B together in a fixed relationship," where the specification discloses that A and B are made of wood and secured together with nails.\footnote{118. Concepts, Inc. v. Cardinal Indus., 145 F.3d 1303, 1309 (Fed. Cir. 1998). The court did not explicitly endorse this test but seemed to apply it in its analysis.}

At first glance, it would seem that the likely scope of § 112, ¶ 6 equivalency would be large. Certainly, of the endless varieties of fasteners or other securing mechanisms,\footnote{119. See Baltimore Therapeutic Equip. Co. v. Loredan Biomedical, Inc., 26 F.3d 138, Nos. 93-1301, 93-1331, 1994 WL 124022, at *7 (Fed. Cir. Apr. 12, 1994).} it seems quite possible that large numbers of them would be suitable for use in the context of the claimed invention. That is, although evidence on the point would be required, it seems safe to guess that quite a number of securing mechanisms would probably be known to be interchangeable with nails in the context of the invention as a whole, or would likely be considered obvious variants of nails in the context of the invention as a whole.

But the structural equivalency rubric could easily be used to deny § 112, ¶ 6 equivalency for most, if not all, such securing mechanisms. The accused infringer who substitutes, say, adhesive for nails can obviously point to dramatic "structural" differences and argue that there is no structural equivalency, and hence no § 112, ¶ 6 equivalency. The accused infringer who substitutes magnets or even clamps seems equally well-positioned. Even the accused infringer who substitutes screws could argue, of course, that screws are fundamentally different structurally from nails. The structural equivalency rubric elevates these arguments and discounts all of the myriad other forms of equivalency evidence that may be far more illuminating than hypertechnical attempts to characterize structural geometry. Indeed, the structural equivalency rubric would seem to encourage a regime in which any structure which is not literally a nail is very likely outside the scope of the means expression. This is a regime in which structural equivalency is little more than a felicitous shorthand for no equivalency.

The structural equivalency rubric should be banished for the reasons that I have outlined above. It does not convey useful concepts, and may corrode the § 112, ¶ 6 equivalency analysis by masking a priori conclusions of no equivalency. Eliminating "structural equivalency" from the § 112, ¶ 6 vocabulary might clear the way for a more carefully nuanced articulation of the test for § 112, ¶ 6 equivalency.

The most important point to grasp here is that the court need not start from scratch. Quite to the contrary, traditional indicia of equivalency developed in connection with the doctrine of equivalents could enrich § 112, ¶ 6 equivalency jurisprudence. Though it would be unwise for the Federal Circuit to construct an inflexible, exclusive test for § 112, ¶ 6 equivalency, the court could reform its jurisprudence by recognizing explicitly that the following considerations are relevant to § 112, ¶ 6 equivalency determinations.120

1. Insubstantial Differences

The Federal Circuit, in its en banc Hilton-Davis Chemical Co. v. Warner-Jenkinson Co. opinion, expressed a preference for framing equivalency issues under the doctrine of equivalents as questions of the insubstantiality of the differences between the accused device and the claimed invention.121 The notion of insubstantial differences, for whatever minimal analytic content it might contain, should be equally applicable to § 112, ¶ 6 equivalency determinations. Indeed, the Federal Circuit has already recognized that § 112, ¶ 6 equivalency and doctrine of equivalents equivalency both invoke "the familiar concept of an insubstantial change which adds nothing of significance."122 Confirming this principle today would at least have

---


the symbolic effect of indicating that similarities between the two equivalency determinations would be taken seriously.\textsuperscript{123}

2. Known Interchangeability

Evidence that an accused device includes structure that was known to those of ordinary skill in the art to be interchangeable with the disclosed structure corresponding to a means clause should also be relevant to § 112, ¶6 equivalency determinations. Evidence of interchangeability should, of course, be tailored to the context of the claimed invention; evidence of interchangeability in the abstract should be viewed with caution.

The Federal Circuit seems inclined to consider interchangeability evidence in § 112, ¶6 context,\textsuperscript{124} but tends to receive it with substantial skepticism. For example, in \textit{Chiuminatta Concrete Concepts, Inc. v. Cardinal Industries, Inc} [hereinafter \textit{Chiuminatta}], the patentee argued that the accused wheels were interchangeable with the disclosed skid plate. The court accepted that known interchangeability could be a factor in determining equivalency, but was extremely parsimonious in its application to the facts at hand:

This argument is not persuasive. Almost by definition, two structures that perform the same function may be substituted for one another. The question of known interchangeability is not whether both structures serve the same function, but whether it was known that one structure was an equivalent of another.\textsuperscript{125}

\textsuperscript{123} qualified its assertion carefully, stating “[i]n the context of section 112, however, an equivalent results from an insubstantial change which adds nothing of significance to the structure, material, or acts disclosed in the patent specification.” \textit{Id.} See also \textit{Dawn Equip. Co. v. Kentucky Farms, Inc.}, 140 F.3d 1009, 1018 (Fed. Cir. 1998) (Plager, J., additional views) (pointing out that the fact that both tests invoke the notion of insubstantial change “suggests at the least that the tests for equivalence under the statute and the doctrine are quite similar, if not the same”).

\textsuperscript{124} In \textit{Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus.}, 145 F.3d 1303, 1309 (Fed. Cir. 1998), the court rejected the patentee’s effort to rely upon alleged “insubstantial differences” to establish § 112, ¶6 equivalency. The patentee had argued that the accused wheels and the disclosed metal plate were equivalent because in use, the wheels compressed to form “flattened planes,” like the flattened planes formed by the metal plate. \textit{Id.} The court declared that the “fundamental flaw” in the patentee’s argument “is that ‘flattened planes’ are not structure.” \textit{Id.} Such an analysis gives the appearance of strict adherence to structural equivalency. A more acceptable analysis would have weighed the evidence of structural dissimilarities against the evidence of insubstantial differences rather than dismissing the latter out of hand as being unrelated to structure.

\textsuperscript{125} See, e.g., \textit{Chiuminatta}, 145 F.3d at 1309-10; \textit{B. Braun Med., Inc. v. Abbott Lab., Inc.}, 124 F.3d 1419, 1425 (Fed. Cir. 1997) (referring in passing to lack of interchangeability between accused and disclosed structures).

\textsuperscript{125} \textit{Chiuminatta}, 145 F.3d at 1309-10.
These sentiments have some merit. The court should look carefully for evidence that those of ordinary skill in the art would have recognized the alleged interchangeability.\textsuperscript{126} On the other hand, the court must avoid becoming so enamored of the comparison of structure that it renders § 112, ¶ 6 equivalency a nullity and forces the patentee to accept coverage over nothing more than the disclosed structure.\textsuperscript{127}

3. Obvious Variation

The use of obviousness as an analog for equivalency under the doctrine of equivalents is a familiar practice in foreign patent systems and is periodically mentioned in connection with the U.S. doctrine of equivalents.\textsuperscript{128} Evidence that an accused structure is a mere obvious variation of the disclosed structure corresponding to a means clause should be relevant to determinations of § 112, ¶ 6 equivalency.\textsuperscript{129} At least one District Court seems to have considered evidence of obviousness in a § 112, ¶ 6 determination, in a case later affirmed by the Federal Circuit.\textsuperscript{130}

\textsuperscript{126} The court plainly had concluded that the patentee’s interchangeability evidence was deficient in this regard. See id. at 1310 (“Chiuminatta has not alleged that those of ordinary skill in the art recognized the interchangeability of metal plates with wheels for supporting the surface of concrete.”).

\textsuperscript{127} This may have occurred in Chiuminatta. The court insisted that interchangeability evidence “does not obviate the statutory mandate to compare the accused structure to the corresponding structure.” Id. In addition, the court seemed to indicate that only by explicit disclosures in the specification could the patentee really prove known interchangeability:

Significantly, the patent discusses the use of wheels in the context of supporting and stabilizing the saw, but never once suggests that wheels could perform the function of the skid plate . . . . [T]here is no hint in the specification that the skid plate could be replaced by small wheels adjacent to the blade for supporting the concrete.

\textit{Id.} It would be an extremely unfortunate development if known interchangeability could be evidenced only by express statements in the specification. Equivalency under § 112, ¶ 6 is of no meaning if it can be established only through express disclosure.

\textsuperscript{128} See, e.g., Roton Barrier, Inc. v. Stanley Works, 79 F.3d 1112, 1128 (Fed. Cir. 1996) (Nies, J., additional views) (“A substitution in a patented invention cannot be both nonobvious and insubstantial. I would apply nonobviousness as the test for the ‘insubstantial change’ requirement of Hilton Davis.”).

\textsuperscript{129} The time frame for this obviousness analysis would require some careful consideration. It might be appropriate to measure obviousness in this context as of the time of the infringement, to enable the patentee to receive coverage over technologies developed after the filing of the patent application. The timing issue also arose in Chiuminatta, in connection with the application of the doctrine of equivalents to means expressions. See Chiuminatta, 145 F.3d at 1310. See also infra Part III.B.

4. Substantial Similarity of "Way"

The familiar function, way, result analysis remains important to equivalency determinations under the doctrine of equivalents, both as a matter of providing an overall framework for equivalency analysis and for testing equivalency at the level of individual claim limitations. The Federal Circuit should expressly recognize that evidence establishing substantial similarity of "way" (that is, evidence that relevant components in the accused device operate in substantially the same way as do the disclosed components) is relevant to § 112, ¶ 6 equivalency determinations.

In a sense, this follows from what has been outlined already, because the "way" prong of the equivalency analysis may function mainly as a vehicle for importing a wide range of considerations, including known interchangeability, obvious variation, insubstantial differences, and so forth, into the equivalency analysis. However, it is particularly important that the Federal Circuit expressly embrace the way prong in the § 112, ¶ 6 context, for several reasons. First, the "way" prong has demonstrated, through long evolution in the context of the doctrine of equivalents, that it is the most vigorous of the function-way-result family; many judges deciding doctrine of equivalents cases on the basis of the tripartite test seem to find the "way" prong to be the most effective tool for equivalency. To deny courts access to the "way" analysis in the § 112, ¶ 6 context is to relegate courts to a crabbed, narrow analysis of equivalency.

Second, it is important for the Federal Circuit to endorse expressly the use of the "way" prong in § 112, ¶ 6 equivalency analyses because existing Federal Circuit case law could be read as expressing hostility to the notion. The Federal Circuit steadfastly

131. See, e.g., Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 28-29 (1997) (doctrine of equivalents is analyzed on element-by-element basis); id. at 40 ("An analysis of the role played by each element in the context of the specific patent claim will... inform the inquiry as to whether the substitute element matches the function, way, and result of the claimed element, or whether the substitute element plays a role substantially different from the claimed element.").

132. The "substantially the same result" prong may also be useful.

133. See, e.g., Slimfold Mfg. v. Kinkead Indus., 932 F.2d 1453, 1457 (Fed. Cir. 1991); Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 940-41 n.3 (Bennett, J., dissenting) ("[T]he relevant inquiry, as it is in nearly all doctrine of equivalents analyses, is whether the accused device and the claimed invention perform the same overall function to achieve the same overall result in substantially the same way.").

134. If I am correct that the "way" prong is a vehicle for other traditional indicia of equivalency, then denying courts access to the "way" prong in applying § 112, ¶ 6 may be tantamount to denying courts access to most or all traditional indicia of equivalency, leaving room for an analysis based solely upon structural equivalency.
insisted in *Valmont Industries Inc. v. Reinke Manufacturing Co.* that "[a] determination of section 112 equivalence does not involve the equitable tripartite test of the doctrine of equivalents."\(^{135}\) To the extent that this means that the full function-way-result test, in its entirety, cannot be used to determine § 112, ¶ 6 equivalency, this proposition is true. Courts should not purport to analyze substantial similarity of function when determining § 112, ¶ 6 equivalency, because the literal infringement framework for means expressions already calls for the accused device to perform the *identical* function recited in the claim. But this does not rule out (and should not be read to rule out) reliance on the "way" prong (and the result prong) for determining § 112, ¶ 6 equivalency.\(^{136}\) Indeed, a reading that eliminates use of the "way" prong in § 112, ¶ 6 analyses would conflict with previous decisions.\(^{137}\)

Finally, a Federal Circuit acknowledgment that the way prong may be used in determining § 112, ¶ 6 equivalency would confirm that courts are free to consider factors going beyond a structures-only comparison. To some extent, this would validate existing practices, in which courts seem instinctively to gravitate towards at least some cautious and attenuated version of the way prong in their § 112, ¶ 6 equivalency analyses. A good recent example in a District Court case is Judge Ellis' opinion in *Odetics, Inc. v. Storage Technology Corp.*\(^{138}\) Judge Ellis commenced his § 112, ¶ 6 equivalency inquiry by elaborating on physical structural differences between the accused device and the disclosed structure corresponding to the relevant means language.\(^{139}\) This is a pure "structural" equivalency approach, and, predictably, it cut against any finding of equivalency. But Judge Ellis extended the analysis beyond a rigid comparison of structure: "[s]econd, the structures, because they are physically different,

\(^{135}\) Valmont Indus. v. Reinke Mfg., 983 F.2d 1039, 1043 (Fed. Cir. 1993).

\(^{136}\) See *Dawn Equip. Co. v. Kentucky Farms, Inc.*, 140 F.3d 1009, 1019 (Fed. Cir. 1998) (Plager, J., additional views) ("With regard to the suggestion in Valmont that the function-way-result test is not applicable to determining equivalence under § 112, ¶ 6, it is not readily apparent why use of the 'way' and 'result' parts of the tripartite tests... would not also be helpful in the § 112, ¶ 6 context."). Judge Plager also points out that in view of recent statements equating the tripartite test with notions of insubstantial differences, the applicability of the way and result prongs to § 112, ¶ 6 equivalency is even more evident. See *id.* at 1019-20.

\(^{137}\) See *Janis, supra* note 7, at 221-22 (discussing early Federal Circuit and pre-Federal Circuit decisions adopting *Graver Tank* principles in § 112, ¶ 6 equivalency determinations).


\(^{139}\) See *id.* at 814 ("In the disclosed structure, the gear is a disc or cylinder with teeth that fit with the teeth of another gear, thus enabling the disclosed gear to move in conjunction with the bin array, whereas the cam followers [of the accused device] are smooth pins attached to the array by a stem, and turn independently from the array.").
perform the claim function differently. Here the gear turns the bins about a single rod, whereas the cam followers, in conjunction with the lead screw and the ball slide, turn the bins by following the path of the cam.”\textsuperscript{140} This surely is an analysis of substantial similarity of “way,” albeit one that is closely fettered to structure.

Even this very limited “way” analysis seems to make the outcome of the equivalency determination more palatable. The equivalency analysis would potentially be much richer had the court been free to employ the range of traditional indicia of equivalency in addition to the pure comparison of structure. The rigid limitations of structural equivalency cramped Judge Ellis’ style.\textsuperscript{141} Perhaps it also discouraged the litigants from introducing evidence relevant to other indicia of equivalency, such as interchangeability or the like, which might have facilitated a more thorough and meaningful evaluation of equivalency.

Another recent District Court decision illustrates how a departure from strict structural equivalency could be the key determinant of the outcome of a literal infringement analysis involving means expressions. In \textit{Wang Laboratories, Inc. v. Oki Electric Indus.},\textsuperscript{142} Wang's patent for computer memory modules included a claim containing the means expression, “support means for supporting the memory module at an angle with respect to the printed circuit motherboard when the memory module is installed thereon . . . .”\textsuperscript{143} The patent disclosed a leaded module, meaning, of course, that the module included terminals having leads attached, the leads being sized and positioned to fit into holes formed in a motherboard. Once positioned in the motherboard, the leads were soldered for support.\textsuperscript{144} The accused device, by contrast, included a “leadless” module, meaning that the module’s terminal pads included no leads. In use of the leadless module, a gripping socket is first

\textsuperscript{140} Id.

\textsuperscript{141} Indeed, Judge Ellis emphasized the limited opportunity to show § 112, ¶ 6 afforded by current Federal Circuit case law, stating “unless the accused structure reads very closely on the disclosed structure, the two will not be deemed equivalent under § 112, ¶ 6.” \textit{Id.} at 811 (proceeding to note that under \textit{Chiuminatta}, the lack of § 112, ¶ 6 equivalency is fatal not only to literal infringement, but also to infringement under the doctrine of equivalents in the usual case). See infra Part IV.B. for an analysis of \textit{Chiuminatta}'s impact on the availability of the doctrine of equivalents for means expressions.


\textsuperscript{143} \textit{Id.} at 173.

\textsuperscript{144} See \textit{id.} at 178. The court here refers simply to “Wang’s leaded modules.” I am presuming for purposes of this discussion that the court is referring to the disclosure appearing in the patent-in-suit.
plugged into the motherboard, and the leadless module is then inserted into the socket.\textsuperscript{145}

A structures-only comparison — i.e., a strict adherence to structural equivalency — presumably would have resulted in a finding of no § 112, ¶ 6 equivalency on these facts. In the accused device, the absence of leads on the module and the presence of the intervening gripping socket surely would have supported a finding of no structural equivalency as that label has commonly been applied.

Interestingly, though, although the court made reference to the "structural equivalency" standard, it actually allowed for a much more wide-ranging equivalency analysis incorporating traditional equivalency indicia. The court was particularly taken by the special master's determination (based upon an admission made by defendant Oki) that "the two support mechanisms were used interchangeably at the time Wang acquired its patents."\textsuperscript{146} The court also approved of what appears to have been a very generous application of the "substantially the same way" analysis.\textsuperscript{147} Ultimately, the court accepted the special master's finding of equivalency. Whether or not this finding would survive eventual Federal Circuit scrutiny is difficult to determine based upon the facts revealed in the opinion. The case may well, however, present the Federal Circuit with a clear methodological choice between the pure structural equivalency approach and an approach that recognizes the value of traditional indicia of equivalency. If it has the opportunity, the court should choose the latter.

To summarize, traditional principles of equivalency developed under the doctrine of equivalents for determining equivalency to a limitation transfer readily to § 112, ¶ 6 equivalency determinations. The underlying principle at work here is that equivalents under the doctrine and equivalents under § 112, ¶ 6 are nearly indistinguishable. They are not equals in the strictest sense: equivalency to a limitation under the doctrine can be analyzed by determining the similarity of

\textsuperscript{145} See id.

\textsuperscript{146} Id. Interestingly, the court also agreed with the special master's rejection of defendant Oki's argument as to interchangeability, noting "[t]he special master rejected Oki's claim that structural equivalency would require complete interchangeability between leaded and leadless modules. Oki pushes the concept of structural equivalency too far with this argument."

\textsuperscript{147} Id. The court pointed out that according to the special master, although the accused and disclosed devices "work differently," there was nonetheless equivalency, because "each module uses the terminal pads to connect to the motherboard in some way. Each support system supports the module equally effectively, providing the same resistance to torsion." \textit{Wang Lab.}, 15 F. Supp.2d at 178.
function, way, and result; equivalency to the structure corresponding to a means expression can be analyzed by determining the similarity of way and result, and identity of function. Thus, while it is incorrect to say that all equivalents are created equal, it is correct to say that all equivalents are created equivalent.

In Chiuminatta, the Federal Circuit has finally provided commentary leading towards this result. As the court put it:

Although an equivalence analysis under § 112, ¶ 6, and the doctrine of equivalents are not coextensive (for example, § 112, ¶ 6, requires identical, not equivalent function) and have different origins and purposes, their tests for equivalence are closely related. . . . Both § 112, ¶ 6, and the doctrine of equivalents protect the substance of a patentee’s right to exclude by preventing mere colorable differences or slight improvements from escaping infringement, the former, by incorporating equivalents of disclosed structures into the literal scope of a functional claim limitation, and the latter, by holding as infringements equivalents that are beyond the literal scope of the claim. They do so by applying similar analyses of insubstantiality of the differences.148

This is a good start towards articulating a more meaningful, better grounded § 112, ¶ 6 equivalency analysis.149

IV. FUNCTIONAL EXPRESSIONS AND THE DOCTRINE OF EQUIVALENTS

If all equivalents are, indeed, created equivalent, what does this say for application of the doctrine of equivalents to a means expression where literal infringement has failed? Specifically, is resort to the doctrine of equivalents precluded in such circumstances, on the basis that once equivalency has been exhausted in the course of the literal infringement analysis, it would be merely duplicative to engage in an equivalency analysis under the doctrine of equivalents?150 In this section, I offer a framework that gives a role,


149. Unfortunately, other restrictive statements in Chiuminatta detract from the quoted passages. See supra Part III.B.

150. Judge Plager apparently takes this position. See Dawn Equip. Co. v. Kentucky Farms, Inc., 140 F.3d 1009, 1021-22 (Fed. Cir. 1998) (Plager, J., additional views). Judge Plager argues that dual notions of equivalency are confusing, and Congress’ inclusion of equivalency in § 112, ¶ 6 amounts to a codification of the doctrine of equivalents for means expressions. Accordingly, “the separate judicially-created doctrine of equivalents would have no application to those aspects of limitations drawn in means-plus-function form.” Id. at 1022. The framework that I propose incorporates these considerations, but also leaves room for
albeit a narrow one, to the doctrine of equivalents in the infringement analysis for means expressions. I also compare the proposed framework to those discussed in important recent Federal Circuit decisions, most notably in Chiuminatta, where the court seemed to recognize that all equivalents are created equivalent, but then proceeded to the caveat that some equivalents are more equivalent than others.

A. A Framework for Applying the Doctrine of Equivalents to Means-Plus-Function Clauses

If, as I have argued, all equivalents are indeed created equivalent, the doctrine of equivalents could properly have only a limited role to play for means expressions. Where a literal infringement assertion fails because an accused device includes no structure that is equivalent to the disclosed structure corresponding to a means expression, it is difficult to understand what is gained by allowing a patentee to make a duplicative equivalency assertion under the doctrine of equivalents. Surprisingly, in a number of cases, the Federal Circuit has proceeded with a duplicative doctrine of equivalents analysis anyway.

This does not mean, however, that all assertions of equivalency under the doctrine of equivalents that apply to means expressions
should be precluded. In *Pennwalt Corp. v. Durand-Wayland, Inc.*, the Federal Circuit hinted that the critical dividing line between literal infringement and doctrine of equivalents infringement for means expressions might lie in the analysis of function.\(^\text{153}\) While a literal infringement analysis of a means clause requires a determination that the accused device carries out the identical function recited in the means clause, the doctrine of equivalents, as traditionally formulated, is not so constrained, extending instead to accused devices that perform substantially the same function. Unfortunately, the court phrased the analysis in the negative:

> 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.\(^\text{154}\)

In *Laitram v. Rexnord*, the issue of the doctrine’s applicability to means clauses arose again, but the court was even more inscrutable, averring only that the doctrine “may not be as limited” as equivalency under § 112, ¶ 6.\(^\text{155}\)

The court could clarify matters by stating positively that the doctrine of equivalents is available to capture accused devices that use structure that is equivalent to the disclosed structure, and perform substantially the same function called for in the means expression. Accordingly, an infringement framework for means expressions would be expressed along the following lines:

1. A means expression is literally satisfied where the accused device performs the identical function called for in the means expression, using structure that is the same as or equivalent to the disclosed corresponding structure.

2. A means expression is satisfied under the doctrine of equivalents where the accused device performs substantially the same function called for in the means expression, using structure that is the same as or equivalent to the disclosed corresponding structure.\(^\text{156}\)

The Federal Circuit’s decision in *Unidynamics Corp. v. Automatic Products International, Ltd.*\(^\text{157}\) is consistent with this framework for application of the doctrine of equivalents to means

\(^{153}\) *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931 (Fed. Cir. 1987).

\(^{154}\) *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987).


\(^{156}\) See Janis, *supra* note 7, at 211-12 for a similar proposal.

expressions. Analyzing the means expression "spring means tending to keep the door closed,"\textsuperscript{158} the court found that the language in fact fell under § 112, ¶ 6, but that the functional recitation ("tending to keep the door closed") must be read to require the exertion of a biasing force at all times.\textsuperscript{159} The accused device employed either a magnet or a padded bracket, neither of which performed the identical "tending" function as defined by the court, precluding a finding of literal infringement.\textsuperscript{160}

In considering whether the patentee's infringement assertion could nonetheless be saved by application of the doctrine of equivalents, the court focused on substantial similarity of function. According to the court:

[Neither version of the [accused device] has any structure that performs substantially the same function of "tending to keep the door closed." No reasonable jury could find that maintaining the can loading door in a closed position is substantially the same function as tending to keep the door closed regardless of the position it is in. Therefore, neither version ... infringes the '750 patent under the doctrine of equivalents.\textsuperscript{161}]

It is to be expected that under this framework, the doctrine of equivalents would rarely be reached for means expressions.\textsuperscript{162} Most cases involving means expressions would center around whether the accused device includes an equivalent to the disclosed corresponding structure, a component of the literal infringement analysis. Assuming that the court eliminates restrictive notions of structural equivalency and replaces them with traditional notions of equivalency, this framework should provide patentees with a reasonable claim scope and should overcome the duplication problem identified in \textit{Dawn Equipment Co. v. Kentucky Farms, Inc.} and \textit{Chiuminatta}.\textsuperscript{163}

\textsuperscript{158} \textit{Id.} at 1314.

\textsuperscript{159} \textit{Id.} at 1322 ("[W]hen read in light of the written description, 'tending to keep the door closed' requires a closing action in addition to keeping the door closed once it is in a closed position.").

\textsuperscript{160} \textit{Id.}

\textsuperscript{161} \textit{Id.} at 1322-23.

\textsuperscript{162} On the related point of whether the notion of "equivalent" function is likely to have much practical impact, see \textit{Pretty & Bassett}, supra note 120, at 375 (noting that the opportunity to demonstrate equivalent function remains under the doctrine of equivalents analysis, but questioning whether fact-finders will be able to differentiate meaningfully between "identical" and "equivalent" function).

\textsuperscript{163} \textit{See supra} notes 151-152 and accompanying text.
B. Chiuminatta: Some Equivalents are More Equivalent than Others?

In Chiuminatta, the Federal Circuit adopted a framework that is in many ways similar to that which I have outlined above. Importantly, the court recognized the similarities between § 112, ¶ 6 equivalents and equivalents under the doctrine, but also refused to leap to the conclusion that because of these similarities there is no role for the doctrine of equivalents as it relates to means expressions.

However, Chiuminatta adds a wrinkle that may, ironically, lead courts back towards the application of a rigid structural equivalency concept for literal infringement. According to the court in Chiuminatta, equivalency under the doctrine of equivalents can encompass future-developed technology — that is, technology developed after the patent’s issue date. The role of the doctrine of equivalents as applied to means expressions is tied to this quality of the doctrine, according to the court:

There is an important difference, however, between the doctrine of equivalents and § 112, ¶ 6. The doctrine of equivalents is necessary because one cannot predict the future. Due to technological advances, a variant of an invention may be developed after the patent is granted, and that variant may constitute so insubstantial a change from what is claimed in the patent that it should be held to be an infringement. Such a variant, based on after-developed technology, could not have been disclosed in the patent. Even if such an element is found not to be a § 112, ¶ 6 equivalent, because it is not equivalent to the structure disclosed in the patent, this analysis should not foreclose it from being an equivalent under the doctrine of equivalents.

That is, under the Chiuminatta approach, even though all equivalents are equivalent, some equivalents seem to be more equivalent than others. Later-developed equivalents are, effectively, lesser equivalents; they cannot be captured via a literal infringement.

---


165. The court concludes merely that “a finding of a lack of literal infringement for lack of equivalent structure under a means-plus-function limitation may preclude a finding of equivalence under the doctrine of equivalents.” Chiuminatta, 145 F.3d at 1310.

166. Id.
analysis, but might only be captured through application of the doctrine of equivalents.

*Chiuminatta* seems to proceed from an important assumption about the temporal aspect of the infringement inquiry: specifically, that while the doctrine of equivalents is assessed as of the time of the infringement,\(^\text{167}\) literal infringement (including the analysis of equivalency for §112, ¶6 literal infringement purposes) must be measured as of the time of patent issuance, or perhaps even as early as the application filing date. The broad supposition operating here is that the *literal* scope of the claims, once those claims are issued, remains fixed, justifying (at least in part).

This is a supposition worth questioning. Commentators, and the Federal Circuit itself, have recognized the possibility that the literal meaning of a claim term may change over time.\(^\text{168}\) Professor Merges has referred to the possibility of expansion of the “real working content” of claim phrases, “reflecting the inevitable growth of [the relevant] technology.”\(^\text{169}\) One can well imagine, for example, a claim drafted in the mid-1980’s employing the phrase “computer network.” It seems very likely that the literal meaning of “computer network” in the mid-1980’s differs substantially from the literal meaning of that phrase today. It may well be incorrect to suppose that the literal scope of a claim is frozen as of issuance.

Accordingly, *Chiuminatta* seems to present an unnecessarily complicated approach to the problem of later-developed technologies. A simpler approach would favor measuring § 112, ¶6 equivalents as of the time of the infringement, just as equivalents under the doctrine traditionally have been analyzed.\(^\text{170}\) Later-developed technology that


\(^{169}.\) ROBERT P. MERGES, *PATENT LAW 699* (2d Ed. 1997) (discussing the “temporal paradox” between enablement, which is measured as of the application filing date, and obviousness, which is measured as of the date of invention).

\(^{170}.\) Early Supreme Court cases engendered confusion over whether equivalency under the doctrine of equivalents should be measured as of the patent application filing date or as of the time of the infringement. See 3 MARTIN J. ADELMAN ET AL., *PATENT LAW PERSPECTIVES* § 3.4 [2] (1997), comparing *Morley Sewing Machine* (measuring equivalency as of the time of the infringement, at least for pioneering inventions) with *Halliburton* (appearing to endorse the measurement of equivalency as of the application filing date, at least for “combination”
is equivalent in the doctrine of equivalents sense would presumably be equivalent in the § 112, ¶ 6 sense. The patentee would be accorded literal coverage over later-developed technologies, in keeping with the principle that all equivalents are created equivalent.

Aside from injecting an unnecessary additional layer of complexity into § 112, ¶ 6 analysis, the Chiuminatta rule on the doctrine of equivalents has uncomfortable negative implications\(^1\) for § 112, ¶ 6 literal infringement analysis. By arrogating later-developed technology exclusively to the domain of the doctrine of equivalents, the Chiuminatta rule leaves existing alternative technologies for analysis under the literal infringement regime. But Chiuminatta imposes an improper burden on patentees concerning the disclosure of existing of alternative technologies in the patent specification. Specifically, Chiuminatta implies that existing technology that is not disclosed in the patent specification will fall outside the reach of § 112, ¶ 6 equivalents.\(^2\) This, of course, is

\(^1\) The potential negative implications of the Chiuminatta rule can perhaps best be understood by departing from the strict context of functional claiming and considering more generally what the Supreme Court meant by announcing that equivalency under the doctrine of equivalents is to be measured as of the time of infringement. See Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 37 (1997) (announcing the rule without reference to any supposed distinction between “pioneering” and “combination” inventions).

\(^2\) On the one hand, it might be assumed that the Court intended to craft an ameliorative rule that emphasizes that equivalency can extend to developments that would have been unforeseeable as of the filing date, without meaning necessarily to exclude from equivalency those alternatives that were known or foreseeable at the time of the filing but were not disclosed. The operative view here might be that the range of equivalents ordinarily expands over time from the filing date to the date of infringement. Under this view, the range of equivalency as measured as of the date of infringement would ordinarily include those equivalents known as of the filing date; the greater, that is, including the smaller.

On the other hand, as Professor Adelman has pointed out, the rule might spring from quite a different view, premised on the truism that even the most diligent patent applicant cannot be expected to disclose unforeseeable future developments in the patent application. Under this view, measuring equivalency as of the date of infringement is justifiable on the ground that equivalency offers the diligent patentee recourse to capture unforeseeable future developments. But under the “diligent patentee” approach, there is arguably no justification for also extending equivalency to alternatives that were known as of the filing date, because (the argument would hold) a diligent patentee would have expressly disclosed those alternatives. See Adelman et al., supra note 170, at § 3.4[1], at 3-42.11 (asserting that “arguably” equivalents that were known as of the filing date but not disclosed “should not qualify for the doctrine of equivalents because they must have been excluded by mistake”).

As between these two approaches, Chiuminatta seems closer to the latter. Accordingly, at least in the context of functional clauses, the negative implications of the Chiuminatta rule for alternatives known as of the filing date must be given careful consideration.

172. The court remarked that where, as on the facts of Chiuminatta, the technology
improper; the purpose of the equivalency language in § 112, ¶ 6 is to relieve patentees from having to disclose expressly each and every known alternative to the disclosed structure that corresponds to the means expression.

Additionally, the Chiuminatta caveat does not fit well with the notion that § 112, ¶ 6 is a response to Halliburton. In Halliburton, Justice Black insisted that a means expression should not be construed to cover later-developed technology:

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. . . . Yet if Walker's blanket claims be valid, no device to clarify echo waves, now known or hereafter invented, whether the device be an actual equivalent of Walker's ingredient or not, could be used in a combination such as this, during the life of Walker's patent.¹⁷³

If Congress intended to respond to this aspect of Halliburton by injecting the equivalency notion into § 112, ¶ 6, then it should follow that later-developed technologies fall within the scope of § 112, ¶ 6 equivalents, contrary to the approach espoused in Chiuminatta.

The Chiuminatta caveat for later-developed technologies creates more problems than it solves, especially insofar as it undermines the connections between § 112, ¶ 6 equivalents and equivalents under the doctrine.¹⁷⁴ A simpler framework, in which later-developed technologies would be encompassed within the scope of § 112, ¶ 6 equivalents as applied through the literal infringement analysis, would be preferable.

asserted to be equivalent is known, "it could readily have been disclosed in the patent." Chiuminatta, 145 F.3d at 1311. According to the court, there is no need to proceed with a doctrine of equivalents analysis where the literal infringement analysis reveals that the patentee "could have included in the patent what is now alleged to be equivalent, and did not, leading to a conclusion that an accused device lacks an equivalent to the disclosed structure . . . ." Id.


¹⁷⁴. To cite one additional example, I have argued that the traditional equivalency test of "known interchangeability" could illuminate § 112, ¶ 6 equivalency determinations just as it has done in doctrine of equivalents determinations. Yet under the doctrine of equivalents, interchangeability extends even where only future, unanticipated technological developments enabled the interchangeability. See Janis, supra note 7, at 219-20 (citing authorities). Under the Chiuminatta approach, one would presumably have to develop a special understanding of interchangeability extending only to that technology known at the time of the application filing.
V. FUNCTIONAL EXPRESSIONS AND TRADITIONAL LIMITATIONS ON EQUIVALENCY

Two doctrines have traditionally limited assertions of equivalency under the doctrine of equivalents. The first, prosecution history estoppel, provides that if a party surrenders subject matter during patent prosecution in order to avoid the prior art or otherwise address patentability concerns, the party is precluded from later asserting a range of equivalents that would effectively recapture the surrendered subject matter. Prosecution history estoppel has emerged in post-Warner-Jenkinson Co. v. Hilton Davis Chemical Co. litigation as a critical limitation on equivalency.

The second limitation is the prior art itself. That is, a patentee cannot assert a range of equivalents that would cause the claim as a whole to encompass the prior art, because "a patentee should not be able to obtain, under the doctrine of equivalents, coverage which he could not lawfully have obtained from the PTO by literal claims."

While the courts have spoken to these limiting doctrines frequently in the context of the doctrine of equivalents, they have not as frequently or as fully elaborated how the regime of limiting doctrines apply in the context of §112, ¶6 equivalents. As detailed below, the limiting doctrines can apply in the §112, ¶6 equivalency analysis in much the same fashion as they already apply in the doctrine of equivalents analysis. This should follow as another consequence of recognizing the linkage between §112, ¶6 equivalents and the doctrine of equivalents.

175. "Prosecution history estoppel precludes a patentee from obtaining in an infringement suit protection for subject matter which it relinquished during prosecution in order to obtain allowance of the claims." Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1574 (Fed. Cir. 1997). See also Hester Indus. v. Stein, Inc., 142 F.3d 1472, 1481 (Fed. Cir. 1998) ("Like the [reissue] recapture rule, prosecution history estoppel prevents a patentee from regaining subject matter surrendered during prosecution in support of patentability."). The Supreme Court has recently noted that prosecution history estoppel is "a well-established limit on non-literal infringement." Warner-Jenkinson, 520 U.S. at 30.

176. See, e.g., General Am. Transp. Corp. v. Cryo-Trans, Inc., 93 F.3d 766, 771 (Fed. Cir. 1996) ("[S]ince allowing the claims to encompass [the alleged infringer's] car would cause the claims to cover subject matter obvious over the prior art, the car cannot be held to infringe the '876 patent under the doctrine of equivalents."); Conroy v. Reebok Int'l, 14 F.3d 1570, 1576 (Fed. Cir. 1994) (referring to "the longstanding principle that the prior art restricts the scope of equivalency that the party alleging infringement under the doctrine of equivalents can assert").

A. Prosecution History

The Federal Circuit has identified two distinct roles for the prosecution history in infringement analysis, although it can be difficult to distinguish between the two. First, the prosecution history can be consulted in the course of claim construction, on the theory that statements in the prosecution history may provide additional evidence as to the legally correct meaning of claim terms. This general principle unquestionably can be brought to bear in the context of means-plus-function expressions. According to the Federal Circuit, when a court determines the scope of the “function” portion of a means-plus-function expression, the court is engaging in claim construction. Likewise, when a court determines which disclosed structure corresponds to a recited “means,” this exercise is embraced within the general exercise of claim construction. The Federal Circuit now needs simply to make clear that in accordance with general principles of claim construction, statements from the prosecution history can be used to illuminate the meaning of the “function” and of the range of disclosed structure that properly corresponds to the “means.” Strictly speaking, this usage of the prosecution history would be the application of the prosecution history as intrinsic evidence of claim meaning, as distinct from prosecution history estoppel.

The second role for the prosecution history is, of course, as a basis for prosecution history estoppel, a doctrine that limits assertions of equivalency under the doctrine of equivalents. Prosecution history,

178. See, e.g., Markman v. Westview Instruments, Inc., 52 F.3d 967, 980 (Fed. Cir. 1995) (identifying the claim language, written description portion of the specification, and prosecution history as claim construction tools). See also Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1583 (Fed. Cir. 1996) (including the prosecution history among the sources of “intrinsic evidence” on claim construction).

179. Chiuminatta, 145 F.3d at 1308; see also Unidynamics Corp. v. Automatic Prods. Int’l, 157 F.3d 1311, 1319 (Fed. Cir. 1998); Desper Prods. v. Qsound Lab., Inc., 157 F.3d 1325, 1336 (Fed. Cir. 1998).

180. As the Federal Circuit explained it in Chiuminatta:
   [T]he “means” term in a means-plus-function limitation is essentially a generic reference for the corresponding structure disclosed in the specification. Accordingly, a determination of corresponding structure is a determination of the meaning of the “means” term in the claim and is thus also a matter of claim construction.

Chiuminatta, 145 F.3d at 1308; see also Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed. Cir. 1998).

181. See, e.g., McGill, Inc. v. John Zink Co., 736 F.2d 666, 673 (Fed. Cir. 1984) (distinguishing the use of the prosecution history as a claim construction tool from prosecution history estoppel).
a matter of law,\textsuperscript{182} most commonly arises as a result of a patent applicant's limiting amendments to pending patent claims during the prosecution of a patent application.\textsuperscript{183} The Federal Circuit has periodically articulated a "reasonable competitor" inquiry for prosecution history estoppel, asking whether the claim amendments (or other statements) in the prosecution history would lead a reasonable competitor to believe that the applicant was surrendering subject matter.\textsuperscript{184}

The Supreme Court in \textit{Warner-Jenkinson Co. v. Hilton Davis Chem. Co.} reinforced the existing rule that when a claim amendment is later alleged to give rise to prosecution history estoppel, the court is to assess the reasons for the amendment,\textsuperscript{185} principally distinguishing between amendments made for the purposes of avoiding prior art and amendments made merely to make explicit what was already inherent in the claim. Additionally, the Court fashioned a new presumption: when the inventor provided no reasons in the prosecution history for a claim amendment, the court should presume that the amendment related to patentability and call on the inventor to rebut the presumption, if possible, by providing an alternative explanation for

\begin{itemize}
\item \textsuperscript{182} See, e.g., \textit{Warner-Jenkinson}, 520 U.S. at 30 (referring to prosecution history estoppel as a "legal limitation on the doctrine of equivalents"); see also \textit{Southwall Techns., Inc. v. Cardinal IG Co.}, 54 F.3d 1570, 1579 (Fed. Cir. 1995) (noting prosecution history estoppel is a question of law to be reviewed \textit{de novo}).
\item \textsuperscript{183} Prosecution history estoppel can also arise as a result of other limiting remarks appearing in the prosecution history. See, e.g., \textit{Haynes Int'l v. Jessop Steel Co.}, 8 F.3d 1573, 1579 (Fed. Cir. 1993) ("Thus, an estoppel can be created even when the claim, which is the basis for the assertion of infringement under the doctrine of equivalents, was not amended during prosecution."). See also \textit{Vehicular Techns. Corp. v. Titan Wheel Int'l}, 141 F.3d 1084, 1090 (Fed. Cir. 1998):
\begin{quote}
The available scope of protection of a patent under the doctrine of equivalents is not, however, limited solely by prosecution history estoppel . . . . In addition, a separate body of case law . . . . establishes that, through statements made during prosecution of a patent application, it can become evident that an asserted equivalent is beyond coverage under the doctrine of equivalents.
\end{quote}
In regard to estoppel arising as a result of claim amendments, the Supreme Court's \textit{Warner-Jenkinson} opinion misleadingly implies that the PTO examiner ordinarily suggests specific amendments to the claims during prosecution. See, e.g., \textit{Warner-Jenkinson}, 520 U.S. at 32 n.6 (referring to the PTO "deciding whether to ask for a change" to the claims); id. at 33 (articulating a presumption "that the PTO had a substantial reason related to patentability for including the limiting element added by the amendment"). In reality, the PTO almost invariably leaves it to the applicant to propose and justify claim amendments.
\item \textsuperscript{184} See, e.g., \textit{Desper Prods.}, 157 F.3d at 1338 ("In determining the scope of what, if any, subject matter has been surrendered, the standard is an objective one: what would a reasonable competitor reading the prosecution history conclude has been surrendered."); \textit{Mark I Mktg. Corp. v. R.R. Donnelley \& Sons Co.}, 66 F.3d 285, 291 (Fed. Cir. 1995).
\item \textsuperscript{185} \textit{Warner-Jenkinson}, 520 U.S. at 32-33.
\end{itemize}
the amendment.\textsuperscript{186}

The prosecution history estoppel doctrine can also be brought to bear on the analysis of functional expressions. If it is accepted that the § 112, ¶ 6 equivalency analysis partakes heavily of traditional equivalency notions from the doctrine of equivalents,\textsuperscript{187} then there is every reason to apply to § 112, ¶ 6 equivalency analysis the prosecution history estoppel doctrine as it is enunciated in connection with the doctrine of equivalents. Indeed, given the opportunity, the Federal Circuit should make this plain.

There are, however, complications that might impede what would otherwise seem a relatively straightforward pronouncement. First, before it can decide whether prosecution history estoppel applies to the § 112, ¶ 6 equivalency analysis, it would be useful for the court to resolve the issue of whether the § 112, ¶ 6 equivalency analysis is law (and thereby at least in part a claim construction

\textsuperscript{186} See id. at 33. Subsequent Federal Circuit decisions have made clear that the presumption cannot be invoked when the inventor has supplied reasons for the amendment. For example, the Federal Circuit adeptly summarized the law in \emph{L&L Wings}:

When determining whether prosecution history estoppel applies to limit the doctrine of equivalents, a court must examine the reason why an applicant amended a claim. If such examination indicates that a patent applicant has made a substantive change to his claim that clearly responds to an examiner's rejection of that claim as unpatentable over prior art, prosecution history estoppel applies to that claim; only the question of the scope of the estoppel remains. No presumption needs to be applied in such a case because the reason for the amendment is clear. \emph{Warner-Jenkinson} did not change this aspect of prosecution history estoppel. What \emph{Warner-Jenkinson} did address was the situation in which the prosecution history fails to disclose a reason for a claim amendment.

\textsuperscript{187} See \textit{supra} Parts III and IV.
exercise), or fact. The Federal Circuit currently views equivalency under the doctrine of equivalents as a question of fact.\textsuperscript{188} Certainly, it would be consistent with the general theme of equivalency between § 112, ¶6 equivalents and doctrine of equivalents equivalents to designate § 112, ¶6 a question of fact.\textsuperscript{189} If the Federal Circuit took this step, it would be sensible to speak of the application of prosecution history estoppel to the § 112, ¶6 equivalency analysis.

A second complication is that existing Federal Circuit case law on the point addresses the role of prosecution history in § 112, ¶6 with less precision than one might desire. In *Alpex Computer Corp. v. Nintendo Co.*, the claim at issue called for first and second “means for generating a video signal,”\textsuperscript{190} and the disclosed structure corresponding to the means clauses included a microprocessor, ROM,

\begin{flushleft}
188. Hilton Davis Chem. Co. v. Warner-Jenkinson Co., 62 F.3d 1512, 1522 (Fed. Cir. 1995) (en banc) ("[I]nfringement under the doctrine of equivalents is an issue of fact to be submitted to the jury in a jury trial with proper instructions, and to be decided by the judge in a bench trial."). The Supreme Court, however, did not resolve this issue. *Warner-Jenkinson*, 520 U.S. at 37-38.

189. There is pre-Markman authority for the proposition that the § 112, ¶6 equivalency inquiry is factual. See *P. M. Palumbo v. Don-Joy Co.*, 762 F.2d 969, 975-76 (Fed. Cir. 1985). However, the Federal Circuit has avoided resolving the question in precedential decisions in the post-Markman era. See supra note 18 and accompanying text.

One non-precedential decision suggests that some judges on the Federal Circuit apparently are prepared to take the position that the equivalency analysis is for the judge, even if equivalency involves fact questions. See *Ranpack Corp. v. Storopack, Inc.*, No. 98-1009, 1998 WL 513598, at *1 (Fed.Cir. July 15, 1998) (non-precedential) (contending that the § 112, ¶6 equivalency analysis falls among the judge’s claim interpretation responsibilities, even to the extent that the analysis requires the judge to resolve factual questions).

Even under this view, the eventual comparison of the claims to the accused device remains in the province of the fact finder. *Ranpack*, 1998 WL 513598 at *3 ("[A] section 112 paragraph 6 infringement analysis requires first a construction of the claim to include means disclosed in the specification and equivalents thereto, and then a factual comparison of the accused device to those equivalents . . . ").

Judges Mayer and Newman, concurring in *Cybor*, are inclined to draw the line differently yet. Apparently this view would hold that the duty to determine the scope of § 112, ¶6 equivalents rests with the judge as part of the claim construction analysis, but that the court must resort to the fact finder where underlying factual questions arise. See *Cyber Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1467 (Fed. Cir. 1998) (Mayer, J., concurring). This mode of analysis may not accomplish very much in clarifying the real world allocation of decisionmaking responsibility given that, as the judges acknowledge, “the resolution of this factual determination is often made at the same time the fact finder determines infringement.” *Id.*

190. The claims at issue were directed to a video game apparatus, and the relevant means-plus-function clauses included “first means for generating a video signal representing a linear player image device aligned in a first direction,” and “second means for generating a video signal representing a ball image device . . . .” *Alpex Computer Corp. v. Nintendo Co.*, 102 F.3d 1214, 1218 (Fed. Cir. 1996).
During the prosecution, the applicant distinguished RAM-based systems of the type disclosed in the specification from prior art systems employing shift registers.

The Federal Circuit seized on these statements as having significant ramifications for the determination of claim scope, but it was not clear whether or not the court was really applying prosecution history estoppel. On the one hand, the court seemed to couch its analysis in terms of the principles of claim construction:

Statements made during the prosecution relating to structures disclosed in the specification are certainly relevant to determining the meaning of the means-plus-function limitations of the claims at issue.

On the other hand, the Federal Circuit analogized its use of the prosecution history to prosecution history estoppel: "Just as prosecution history estoppel may act to estop an equivalence argument under the doctrine of equivalents, positions taken before the PTO may bar an inconsistent position on claim construction under § 112, ¶ 6." Moreover, it is difficult to discern any meaningful difference between the court's analysis and the application of prosecution history estoppel. This is reinforced by the court's doctrine of equivalents analysis, which appears largely to duplicate its literal infringement analysis regarding the role of the prosecution history.

---

191. *Id.* (describing a series of components depicted in Fig. 2 of the specification).

192. The applicant's comments were made in connection with a prior art rejection of application claim 1, but the Federal Circuit insisted that the comments applied with equal force to the construction of the claims ultimately at issue in the litigation. *Id.* at 1220 ("[W]e discern no reason why prosecution history relating to the structure of the video display in the means-plus-function limitations of claim 1 is not pertinent to the same structure of the same display system in the means-plus-function limitations of claims 12 and 13.").

193. *Id.* A recent case which purports to follow *Alpex* in this regard is *Desper Products*. Although the court in *Desper Products* cited *Alpex* for the proposition that the prosecution history is relevant to determining the scope of a means expression, the court was probably confronted with merely a generic claim construction issue. One of the claims at issue, which recited "first and second channel means" also included a modifying expression "said first and second channels being maintained separate and apart prior to being fed to the two transducers." *Desper Prods. v. Qsound Lab., Inc.*, 157 F.3d 1325, 1330-31 (Fed. Cir. 1998) (reproducing the language of claim 7 of the '462 patent). In a dispute over the meaning of "prior to," the court placed weight on the applicant's remarks during the prosecution concerning similar language appearing in another claim. *Id.* at 1339. Because it is not clear that the clause containing the "prior to" language even needed to be treated as part of the channel means expression. Accordingly, the court could simply have relied upon the general principle that statements in the prosecution history are relevant to determining the meaning of claim terms.

194. *Alpex*, 102 F.3d at 1221.

195. The court summarized its analysis as follows: "[a]s discussed above, *Alpex*
The Federal Circuit repeated this pattern in *Cybor Corp. v. FAS Technologies, Inc.* There, the court reviewed a doctrine of equivalents determination on claims that included means plus function limitation. In setting forth the general proposition that statements in the prosecution history could affect the scope of a means-plus-function expression, the court seemed to be invoking a rule of claim construction: “[p]rosecution history is relevant to the construction of a claim written in means-plus-function form . . . . Clear assertions made in support of patentability thus may affect the range of equivalents under § 112, ¶ 6.” Yet in the same breath, the court recited the prosecution history estoppel test as “the relevant inquiry”: “[t]he relevant inquiry is whether a competitor would reasonably believe that the applicant had surrendered the relevant subject matter.” Perhaps it was not surprising, then, that the court concluded that the same analysis that it had used in considering the effect of the prosecution history on the meaning of the claim terms for literal infringement applied to the analysis of the preclusive effect of prosecution history estoppel on the doctrine of equivalents allegation:

[Cybor’s] arguments are unpersuasive for the same reasons that we rejected them under our § 112, ¶ 6 claim construction and literal infringement analysis. The inventor’s statements to the PTO regarding the Storkebaum reference, given the marked differences between the reference and the patented and accused devices, do not show the deliberate, unequivocal surrender of all external reservoirs. Because Cybor’s pump and reservoir with connecting tubing do not fall within the range of subject matter relinquished, prosecution history does not preclude infringement under the doctrine of equivalents. Accordingly, the district court’s denial of Cybor’s motion for JMOL with respect to infringement under the doctrine of equivalents was not error.

In the end, it may be that relatively little other than doctrinal purity is at stake here, because it appears that courts are indeed considering prosecution history statements and using them as a basis for generating an estoppel against assertions of § 112, ¶ 6 described its claims during the prosecution of the ‘555 patent as covering random access systems capable of changing a single bit. It did not and could not claim image generation by shift registers.” *Id.* at 1223.

196. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1451 (Fed. Cir. 1998) (reciting the clause at issue from claim 1, “second pumping means in fluid communication with said first pumping means”).

197. *Id.* at 1457.

198. *Id.*

199. *Id.* at 1460.
equivacency, even where they seem to be employing the rhetoric of claim construction. Nevertheless, the court might forestall potential confusion by owning up to its use of the estoppel doctrine in § 112, ¶6 equivalency determinations.200

B. Prior Art

The prior art, as previously noted, limits the reach of the doctrine of equivalents by precluding assertions of equivalency that would cause the claim as a whole to read on the prior art. Judge Rich’s opinion in Wilson Sporting Goods v. David Geoffrey & Associates201 stands as perhaps the most powerful enunciation of the principle:

[I]t may be helpful to conceptualize the limitation on the scope of equivalents by visualizing a hypothetical patent claim, sufficient in scope to literally cover the accused product. The pertinent question then becomes whether that hypothetical claim could have been allowed by the PTO over the prior art. If not, then it would be improper to permit the patentee to obtain that coverage in an infringement suit under the doctrine of equivalents. If the hypothetical claim could have been allowed, then prior art is not a bar to the infringement under the doctrine of equivalents.202

Whether or not the inquiry is stated in terms of the hypothetical claim analysis,203 it is critical that the inquiry seek to determine

200. Judges Mayer and Newman, in contrast, apparently see an analytical difference between the application of the prosecution history to limit § 112, ¶6 equivalency and its application to limit equivalency under the doctrine of equivalents. As the judges put it in their Cybor concurring opinion:

Just as the fact finder’s infringement analysis differs between equivalence under paragraph 112(6) and the doctrine of equivalents, so too differs the analytical effect of statements made during the prosecution of the patent on construction of the claims. Under paragraph 112(6), a statement made during prosecution may confine the range of equivalent structures, materials, or acts that are directly claimed by the patent. However, in the context of a doctrine of equivalents analysis, the patentee seeks protection beyond that claimed by the patent directly. As such, the judge’s construction of the claims—which includes the interpretation of claim terms—may not be sufficient to remove from the jury’s consideration all subject matter that was disclaimed during prosecution.

Cybor, 138 F.3d at 1467-68. Plainly, this view is founded on the questionable notion, developed in Valmont, that § 112, ¶6 equivalents and equivalents under the doctrine of equivalents differ substantially in origin and purpose. It is difficult to identify any persuasive reason for drawing distinctions between the role of the prosecution history in the two analyses if it is accepted that the two varieties of equivalency in fact do not differ dramatically one from the other.


202. Id. at 684.

203. The hypothetical claim analysis advanced in that opinion has not won uniform
whether the claim as a whole encompasses the prior art. Whether or not a claim limitation encompasses the prior art is, of course, of no moment; components of claimed inventions are often old. Accordingly, while the prior art precludes assertions of equivalency that would cause the claim to be indistinguishable from the prior art, assertions of equivalency that merely would cause a claim limitation to read on the prior art are not necessarily precluded.

The Federal Circuit has recognized as much in the context of the doctrine of equivalents. For example, in *Corning Glass Works v. Sumitomo Electric, USA, Inc.*, the alleged infringer invoked the prior art as a limitation on the patentee’s equivalency assertion. As the Federal Circuit saw it, the alleged infringer’s argument demonstrated only that the equivalency assertion cause a limitation of the claim to encompass the prior art. Rejecting the defense, the court observed that “[n]othing is taken from the ‘public domain’ when the issue of equivalency is directed to a limitation only, in contrast to the entirety of the claimed invention.”

The Federal Circuit spoke again to the question in *Conroy v. Reebok International*. The Federal Circuit observed that the District Court had attempted to apply *Wilson Sporting Goods v. David Geoffrey & Associates* but had not conducted a hypothetical claim analysis:

In this case, rather than perform a hypothetical claim analysis, the district court directly compared the prior art with a single element...of the accused device in an attempt to determine the extent to which prior art limits the application of the doctrine of equivalents...

The Federal Circuit emphasized that while the hypothetical claim analysis was not mandatory, the District Court’s alternative analysis in this case led to error:

In purporting to follow *Wilson*, however, the district court here concluded that the mere existence of an element in the prior art


205. *Id.*

automatically precludes Mr. Conroy from asserting a scope of equivalency sufficient to encompass the corresponding element in the accused device. In so doing, the district court applied an improper test of permissible patent scope under the doctrine of equivalents, and thus contravened the rationale of Wilson [citations omitted]. The district court’s application of an improper scope test, when directly comparing the [prior art] patent with the accused Reebok tabs, results in an overbroad restriction by the prior art on the application of the doctrine of equivalents by Mr. Conroy.\textsuperscript{207}

An appropriate analysis would have considered whether the equivalency analysis caused the claim as a whole to encompass the prior art, applying familiar patentability standards:

While a court may employ a means other than the hypothetical claim analysis set forth in Wilson to determine the extent to which the prior art limits the application of the doctrine of equivalents, a court also must apply standards of patentability consistent with our jurisprudence regarding anticipation and obviousness.\textsuperscript{208}

The same hierarchy should, it would seem, apply to § 112, ¶ 6 equivalency. That is, if an assertion of equivalency in a literal infringement analysis concerning a means expression caused the claim as a whole to read on the prior art (as analyzed by a hypothetical claim analysis or other appropriate analysis), the assertion of equivalency should be precluded. However, an assertion of equivalency that merely causes the means expression to read on the prior art should not necessarily be precluded; the court must ask whether the claim as a whole is rendered unpatentable.

The Federal Circuit seems to have spoken to one half of this hierarchy without speaking to the other, creating the potential for confusion. In Intel v. International Trade Commission,\textsuperscript{209} the Federal Circuit declared flatly that “[i]t is not necessary to consider the prior art in applying section 112, paragraph 6. Even if the prior art discloses the same or an equivalent structure, the claim will not be limited in scope thereby.”\textsuperscript{210} The court has twice reaffirmed this proposition.\textsuperscript{211} The Intel v. International Trade Commission court

\textsuperscript{207} Id. at 1577.
\textsuperscript{208} Id.
\textsuperscript{209} Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821 (Fed. Cir. 1991).
\textsuperscript{210} Id. at 842.
\textsuperscript{211} See Applied Med. Resources Corp. v. United States Surgical Corp., 147 F.3d 1374, 1381 (Fed. Cir. 1998) (stating court did not err in excluding certain testimony about the purported limiting effect of certain prior art references on the scope of § 112, ¶ 6 equivalents,
offered two undifferentiated justifications for its rule: first, a reiteration of suspect comments about supposed differences between the doctrine of equivalents and § 112, ¶ 6 equivalents; and, second, the principle that "[c]laim limitations may, and often do, read on the prior art, particularly in combination patents."

The first justification is inadequate, for reasons that I have developed throughout this article, and the second justification does not support the flat proscription against any consideration of prior art in connection with a § 112, ¶ 6 analysis. If an assertion of § 112, ¶ 6 equivalency would cause a claim as a whole to read upon the prior art, the assertion should be precluded as an extension of the general rule limiting the assertion of equivalency under the doctrine of equivalents. This approach would dovetail with the court's current approach to the use of the prosecution history in connection with § 112, ¶ 6 equivalency assertions. The court should refine its rule enunciated in Intel v. International Trade Commission accordingly.

VI. LIFE WITHOUT § 112, ¶ 6

As set forth in the preceding sections, three main case law reforms flow from a careful reassessment of § 112, ¶ 6 jurisprudence: a literal infringement analysis employing traditional indicia of equivalency (rather than the structural equivalency rubric); a narrow role for the doctrine of equivalents confined to equivalency of function; and recognition of the applicability of traditional limitations on the doctrine of equivalents (prosecution history estoppel and prior art) in their current incarnations. Taken together, these reforms could lead to a more coherent framework for approaching § 112, ¶ 6 clauses.

Still, the framework seems inevitably complex, even inelegant. This should trouble patent policymakers more than it has to date. That the § 112, ¶ 6 equivalency jurisprudence seems inevitably so awkward may hint at structural problems that may call for legislative action. Indeed, at least two crucial structural problems can be

---

212. See Intel, 946 F.2d at 842.
213. Id.
214. See, e.g., Hofmann & Heller, supra note 45, at 290 (concluding that legislative action is warranted). For an alternative view advocating case law reform based around the "as a whole" notion of equivalency, see Deron Burton, Bringing Theory into Practice: Predictable Scope for Functional Patent Claims, 42 UCLA L. REV. 221, 258-261 (1994) (suggesting that the doctrine of equivalents analysis for claims containing means limitations proceed on a
identified, both of which deserve further exploration.

First, § 112, ¶ 6’s disclosure-plus-equivalents clause may simply be an anachronism. As previously discussed, a careful historical synthesis demonstrates that the disclosure-plus-equivalents scheme of § 112, ¶ 6 has links to the doctrine of equivalents as it was understood in the central claiming regime. As Professor Takenaka has pointed out, it may make little sense to cling to an artifact of the central claiming regime when modern claim construction analysis in the United States has turned to a peripheral claiming regime. On this basis alone, one might conclude that § 112, ¶ 6’s disclosure-plus-equivalents regime cannot possibly afford a satisfactory solution to the functional claiming problem today.

This argument speaks to the awkwardness of the solution embodied in § 112, ¶ 6. But what of the problem? Considering as a whole the history of the functional claiming doctrine, and the modern application of § 112, ¶ 6, what problem does § 112, ¶ 6 seek to solve? Courts have expended enormous effort to attempt to shoehorn § 112, ¶ 6 equivalency into the modern infringement framework, but rarely, if ever, have paused to consider the problem that § 112, ¶ 6 is intended to solve. Perhaps, indeed, this is a legislative question. In the answer to this question lies another, more serious potential objection to § 112, ¶ 6 as it is currently formulated: the problem that § 112, ¶ 6 was designed to solve — the “functional claiming problem” — may not be a very compelling problem at all when subjected to a broad reevaluation using modern sensibilities.

This reevaluation can be pursued by considering what would

“claim-as-a-whole” basis to preserve a distinction between equivalents under the doctrine and § 112, ¶ 6 equivalents). This latter proposal may take limited support from early Federal Circuit law, but seems untenable today given the Supreme Court’s unequivocal adoption of the element-by-element approach to equivalency under the doctrine of equivalents in Warner-Jenkinson. See Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40 (1997).

Professor Adelman has espoused yet a different alternative. Professor Adelman would eliminate the structure-plus-equivalents rule, but retain the possibility of limiting a functional clause through application of the reverse doctrine of equivalents:

The proper approach is to treat a functional element as meaning what it says for literal infringement...Then, the court should apply the reverse doctrine of equivalents where the element upon which the functional element is read is so different from that of the disclosed element, that a court should not find infringement.


215. See supra Part II.C.

216. See TAKENAKA, supra note 70, at 2. Professor Takenaka intends to elaborate on this thesis in a forthcoming article.
follow if Congress eliminated the § 112, ¶ 6 disclosure-plus-equivalents provision from the statute.\textsuperscript{217} What would be the modern-day objections to unrestricted functional claiming, and are those objections serious enough to justify imposing a restrictive interpretation?

A. Who’s Afraid? Probing the Functional Claiming Anxiety Closet

This section considers two potential objections to unrestricted functional claiming, drawing upon the historical synthesis presented in Part II. First, unrestricted functional expressions would presumably be objected to as conferring unduly broad claim scope on patentees. As detailed below, many (perhaps all) of the functional claiming cases sound this theme. However, the fear that functional claims are unduly broad is ill-considered and does not justify the § 112, ¶ 6 restriction.

Second, unrestricted functional expressions might draw fire under invalidity/ineligibility theories, particularly indefiniteness. Certainly, there seems to be some historical resonance to this argument, but, as set out below, it likewise fails to justify the existing restrictions § 112, ¶ 6.

1. Exaggerated Fears of Overbreadth

The proposition that a means-plus-function clause is too broad when it encompasses all means for performing the stated function may seem, at first blush, intuitive, and courts appear to have followed

\textsuperscript{217} Others have proposed such a statutory revision. For example, the Intellectual Property Section of the ABA proposed a resolution on the subject in May 1998. The proposed language would excise the restrictive language from § 112, ¶ 6 and explicitly extend means expressions to all means for accomplishing the stated function, unless the patentee indicates otherwise:

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, materials or acts in support thereof; and such element shall be construed to cover all means or steps for performing the specified function in cooperation with the other elements of the combination, except to the extent the claim expressly includes, or is expressly limited to, certain means.


It is also worth noting that most foreign patent systems seem to handle functional claims quite adequately without any restrictive provisions analogous to § 112, ¶ 6. See, e.g., ADELMAN, ET AL., *supra* note 170, § 2.9(5), at 2-1176.17 (collecting European authorities). See also John Richards, Functional Claiming in Europe and the Commonwealth, Address at the Finnegan Lectures, Washington, D.C. (Sept. 1998) (copy on file with author).
this intuition in a number of cases prior to the enactment of § 112, ¶ 6. Yet it is not especially easy to tease out the overbreadth theory from the pre-1952 case law. While some commentary explicitly relied on the undue breadth theory,218 most cases on the subject do purport to apply rules of claim construction or invalidity/ineligibility, as previously detailed. Halliburton itself is emblematic. The Halliburton Court declared that it was addressing the question of whether the invention was “adequately described” under the then-governing provision,219 and held that it was not.220 While conventionally portrayed as an indefiniteness rationale, the Court’s decision was in fact nothing of the kind. Had the claim been indefinite, one probable indicia would have been the extreme difficulty of identifying structure in the specification that corresponded to the functional expression. Yet it was clear from the case that the Court knew exactly the structure that corresponded to the functional expression at issue.221 The Court was concerned about

218. For example, one early commentator acknowledged the overbreadth objection to means expressions and even attempted to formulate guidelines for the application of this concept. H. Hurvitz, Functionality of Patent Claims, 21 J. PAT. OFF. SOCIETY 851, 854-55 (1939). Similarly, at least one treatise writer reinforced the concern as to the overbreadth, in the abstract, of means expressions. See, e.g., DELLER, supra note 1, at § 232, at 663-64:

A functional claim is one which covers all means of arriving at the desired result, although the machine by which such result is obtained may be wholly different from that shown in the patent. It is capable, therefore, of reading on independent subsequent inventions of others. Accordingly, it is objectionable as being too broad.

(emphasis in original).

219. The provision was R.S. 4888, which contained both the indefiniteness of claims provision now contained in § 112, ¶ 2 and the adequacy of disclosure provisions now appearing in § 112, ¶ 1. Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 8 (1946) (“We must, however, determine whether, as petitioner charges, the claims here held valid run afoul of Rev.Stat. § 4888 because they do not describe the invention but use ‘conveniently functional language at the exact point of novelty’ . . . .”).

220. Id. at 13.

221. The functional expression at issue was “means associated with said pressure responsive device for tuning said receiving means to the frequency of the echoes from the tubing collars of said tubing sections to clearly distinguish the echoes from said couplings from each other.” Id. at 9 n.7. As the Court plainly understood, the specification described the corresponding structure as a mechanical acoustical resonator:

The device added [to make echo waves more prominent] was a mechanical acoustical resonator . . . . Walker’s testimony was, and his specifications state, that by making the length of this tubal resonator one-third the length of the tubing joints, the resonator would serve as a tuner . . . . His specifications and drawings also show the physical structure of a complete apparatus, designed to inject pressure impulses into a well, and to receive, note, record and time the impulse waves.

Id. at 7.
undue breadth,222 not about indefiniteness.

A number of commentators at the time of the _Halliburton_ decision questioned whether the indefiniteness rationale was in fact an overbreadth theory.223 Some modern commentators have likewise recognized that the _Halliburton_ decision is really about claim overbreadth, not indefiniteness.224

The _Halliburton_ Court's improper intermingling of indefiniteness and undue breadth was by no means new. Indeed, long prior to _Halliburton_, commentators recognized the danger of abuse of the indefiniteness theory in connection with functional expressions. As one commentator pointed out more than two decades prior to the Court's _Halliburton_ decision:

The functional claim is almost always first refused as "indefinite."
But in the same breath . . . almost invariably the statement follows
that the claim is indefinite because it "covers all solutions of the
problem." With all due reverence for precedent, it is submitted
that there is in such an interpretation a clear contradiction in terms.
A claim which covers everything is not indefinite. . . .

[A] claim which definitely covers all solutions of the problem is no
more indefinite than a claim which covers fewer solutions, or
which covers only one solution. The difference is only in the
breadth.225

Other sources likewise note a propensity for courts to confuse
the indefiniteness and undue breadth theories.226

---

222. At one point the Court even seemed to agree. _See id._ at 12 ("Under these circumstances the broadness, ambiguity, and overhanging threat of the functional claim of Walker become apparent.").

223. _See, e.g._, _Crews, supra _note 23, at 183 (questioning the Court's indefiniteness conclusion on the basis that "it would appear that no person practicing in the art could have very serious doubt as to whether a proposed apparatus included a tuned acoustical means as covered in the claim"); _Zalkind, supra _note 23, at 128 (arguing that the _Halliburton_ court appears to blend indefiniteness and overbreadth concerns); _Conn, supra _note 23, at 292-97 (arguing generally that while the _Halliburton_ Court couched its analysis in terms of precluding functional claims, the Court was actually concerned about claim breadth).


226. _See, e.g._, _Deller, supra _note 1, at § 282 (collecting authorities for the proposition that the indefiniteness and undue breadth theories, while often confused, are distinct). Ironically, the Deller treatise itself may exhibit the same confusion. _See supra _note 218 (noting that the Deller treatise applies an "undue breadth" rationale for the functional claiming
The observation that fear of undue breadth lies at the root of functional claiming doctrine may be critical to efforts to reform § 112, ¶ 6. If, indeed, the § 112, ¶ 6 restriction is predominantly an attempt to address a perceived overbreadth problem, then it is easily assailable as both conceptually inconsistent with existing statutory solutions and cumulative of them. As is well established, the highly subjective, ungainly notion of undue breadth in the abstract has no place in modern U.S. patent law. Instead, U.S. patent law currently regulates claim breadth with comparison to the breadth of the disclosure, using the requirements of § 112, ¶ 1, particularly the enablement requirement and the written description requirement, which feature objective standards.

An example demonstrating that notions of undue breadth are entirely subsumed today under the enablement requirement is In re Vaeck. There, the claimed invention concerned a genetic engineering product which used “Cyanobacteria cells” (blue-green algae) as a host for producing insecticidally active Bacillus proteins. The examiner believed that the recited cyanobacteria were a diverse group of organisms whose molecular biology had not been well delineated, and the applicant’s disclosure referred specifically only to a small number of strains of cyanobacteria. Had the case arisen prior to the Federal Circuit era, it is entirely conceivable that the issue would have been framed in the rhetoric of...
"undue breadth." Instead, the Federal Circuit's analysis of the claim scope issue was founded purely on the enablement requirement.

Plainly, functional claims which read broadly could be tested, like claims in other formats, for compliance with the enablement and written description requirements, without any need to impose the restrictive construction set forth in § 112, ¶ 6. Just as a careful analysis of the roots of § 112, ¶ 6 equivalency shows that the restrictive construction is anachronistic as a solution to the functional claiming problem, a careful analysis likewise shows that the problem itself, framed as a fear of undue breadth, is similarly anachronistic.

2. Vague Apprehensions of Indefiniteness

The indefiniteness rationale for the restrictive construction of functional expressions may still raise concerns. Conventional views would presumably hold that even when disentangled from the notion of undue breadth, indefiniteness would remain an objection to unbridled functional claiming. Certainly, the rationale would have some historical resonance if it were possible to identify cases that genuinely applied an indefiniteness rationale rather than an undue breadth rationale. Moreover, the Federal Circuit has referred, though somewhat offhandedly, to the § 112, ¶ 6 restrictions as forestalling an indefiniteness objection to functional expressions. Indefiniteness concerns may also lie behind the Federal Circuit's recent insistence that the structure corresponding to a means-plus-function expression be "clearly linked" to the means-plus-function expression.

234. Indeed, the examiner cited a portion of the "undue breadth" entry in the Manual of Patent Examining Procedure § 706.03(z). See id. at 492.
235. In re Vaeck, 947 F. 2d at 495-96.
237. For example, the Federal Circuit has declared that:

A structure disclosed in the specification is only deemed to be 'corresponding structure' if the specification clearly links or associates that structure to the function recited in the claim. The duty to link or associate structure in the specification with the function is the quid pro quo for the convenience of employing § 112, para. 6.


For an interesting case on the interaction of § 112, ¶ 1; § 112, ¶ 2; and § 112, ¶ 6 as currently formulated, see In re Dossel, 115 F.3d 942 (Fed. Cir. 1997). See also Personalized Media Communications, LLC v. International Trade Comm'n, 161 F.3d 696, 706 (Fed. Cir. 1998) (reversing a lower court determination that a means clause was indefinite but reminding the court that the claim should also be analyzed for compliance with the enablement requirement).
The prospect of indefinite claims is not a convincing rationale for retaining § 112, ¶ 6 in its current form. The patent statute, § 112, ¶ 2, already provides a baseline requirement that claims avoid indefiniteness. Accordingly, even if unbridled functional expressions are peculiarly susceptible to indefiniteness problems, the patent law provides a remedy. Indeed, even though § 112, ¶ 2 indefiniteness does not seem to play a particularly robust role in modern patent litigation, it is potentially a more potent weapon in the current peripheral claiming regime than it was in the central claiming regime. Whereas courts were more free in the central claiming regime to “interpret” additional elements into a claim to avoid potential indefiniteness problems, modern courts facing genuine cases of indefiniteness must invalidate the claims. If unbridled means expressions are, in fact, inherently subject to indefiniteness problems, courts will presumably begin to invalidate them and patent applicants will presumably begin using them more sparingly.

To be sure, § 112, ¶ 2 indefiniteness has been an underdeveloped, and perhaps even clumsy, doctrine. But Federal Circuit case law already shows how § 112, ¶ 2 could be fine tuned for unrestricted functional expressions. The cases mentioned above, which impose a “duty to link” disclosed structure to means expressions for purposes of applying § 112, ¶ 6, could readily be generalized. That is, a court could certainly expect that under the general requirements of claim definiteness (as set out in § 112, ¶ 2) and adequate disclosure (as set out in § 112, ¶ 1), the elements of a patentee’s claims can reasonably be linked to corresponding disclosure in the specification, irrespective of the form of the claims. The “duty to link” is a useful rubric and courts could continue to apply it in the post-§ 112, ¶ 6 world.

B. Conclusion

The fear of functional claiming, unfortunately, remains extant. It is evident in the very intricacy of § 112, ¶ 6 jurisprudence, and has been evident for some time, even prior to the enactment of § 112, ¶ 6. Today, however, in view of the steadily rising incidence of § 112, ¶ 6 equivalency assertions in patent cases, reform has become

238. 35 U.S.C. § 112 (1994) (“The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.”). The Federal Circuit has supplied an objective standard for evaluating § 112, ¶ 2 indefiniteness issues. See, e.g., Miles Lab., Inc. v. Shandon, Inc., 997 F.2d 870, 875 (Fed. Cir. 1993) (“If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more.”).
imperative. This Paper has proposed a variety of case law reforms which could lend a measure of added stability to § 112, ¶ 6 jurisprudence in the short term without radically reformulating its basic structure. In the longer term, however, legislative reform eliminating the § 112, ¶ 6 restriction may prove a far more sensible alternative.