Unmasking Structural Equivalency: The Intersection of § 112, ¶ 6 Equivalents and the Doctrine of Equivalents

Mark D. Janis

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

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UNMASKING STRUCTURAL EQUIVALENCY: THE INTERSECTION OF § 112, ¶ 6 EQUIVALENTS AND THE DOCTRINE OF EQUIVALENTS

Mark D. Janis*

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* Associate, Barnes & Thornburg, Indianapolis, Indiana; Adjunct Professor of Law, Indiana University School of Law (Bloomington). Readers may wish to consult Baltimore Therapeutic Equip. Co. v. Loredan Biomedical, Inc., Nos. 93-1301, 93-1331, 1994 WL 124022 (Fed. Cir. Apr. 12, 1994) (Rich, J., concurring) (non-
precedential) for the Federal Circuit's most recent statement on the issue dis-
essed herein.
In Valmont Industries, Inc. v. Reinke Manufacturing Co.,\(^1\) the Federal Circuit once again felt it necessary to draw distinctions between Title 35 of the United States Code, section 112, paragraph 6 (§ 112, ¶ 6) “structural equivalency”\(^2\) and equivalency under the doctrine of equivalents.\(^3\) Observing somewhat petulantly that it could not tell whether the trial court was attempting to apply § 112, ¶ 6 or the doctrine of equivalents in arriving at a conclusion of infringement,\(^4\) the Federal Circuit averred that no infringement could be found under proper application of either.\(^5\) It therefore reversed.\(^6\)

This dogged insistence that “structural” equivalence differs from “doctrine of equivalents” equivalence has become a familiar litany in the Federal Circuit literature.\(^7\) Time and time again, the Federal Circuit has scolded the lower courts for intermingling the two types of equivalents, pointing to clear differences between the respective analytical frameworks.\(^8\)

But the Federal Circuit has stopped short of addressing the critical underlying question. That is, accepting arguendo that the frameworks for analyzing the two types of equivalents are distinct, what ultimately is the difference between a “structural” equivalent under the provisions of § 112, ¶ 6 and a “doctrine of equivalents”

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\(^1\) 983 F.2d 1039, 25 U.S.P.Q.2d (BNA) 1451 (Fed. Cir. 1993).

> 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.

\(^3\) Id. It is this final clause which involves concepts of equivalency and gives rise to the label “structural equivalents.”

\(^4\) Valmont, 983 F.2d at 1041-42, 25 U.S.P.Q.2d (BNA) at 1453-54.

\(^5\) Id., 25 U.S.P.Q.2d (BNA) at 1453-54.

\(^6\) Id. at 1045, 25 U.S.P.Q.2d (BNA) at 1456.

\(^7\) See, e.g., Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821, 842, 20 U.S.P.Q.2d (BNA) 1161, 1179 (Fed. Cir. 1991) (“Clearly, Atmel and GI/M have confused equivalence under the doctrine of equivalents with equivalent structure under section 112, paragraph 6.”); Sun Studs, Inc. v. ATA Equip. Leasing, Inc., 872 F.2d 978, 989, 10 U.S.P.Q.2d (BNA) 1338, 1347 (Fed. Cir. 1989) (“The district court may have been led into error by applying to the doctrine of equivalents the more limited scope of the literal infringement provisions of 35 U.S.C. § 112 ¶ 6 . . . .”); D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1575, 225 U.S.P.Q. (BNA) 236, 239 (Fed. Cir. 1985) (“The word ‘equivalent’ in § 112 should not be confused, as it apparently was here, with the ‘doctrine of equivalents.’”).

\(^8\) See infra notes 23-42.
This Article argues that the Federal Circuit must move beyond mere admonishments against confusing § 112, ¶ 6 equivalents and the doctrine of equivalents. The two unquestionably are different at some level of abstraction. However, the Federal Circuit must critically evaluate those differences to determine whether they truly impact the fundamental underlying equivalency determination. This Article concludes that the Federal Circuit should reinforce the notion that the admittedly distinct analyses under § 112, ¶ 6 and the doctrine of equivalents converge as to the critical underlying determination of the meaning of an "equivalent."

I. ANALYTICAL FRAMEWORKS FOR EQUIVALENCY ANALYSIS UNDER § 112, ¶ 6 AND THE DOCTRINE OF EQUIVALENTS

A. Section 112, ¶ 6 and the Doctrine of Equivalents in the Context of the Two-Part Test for Infringement

"The determination of patent infringement is a two-step process":9 The claims are first interpreted,10 and the properly interpreted claims are then applied to the accused device, either literally or under the doctrine of equivalents.11 Once the claim has been interpreted, that interpretation is employed whether the application step proceeds under a theory of literal infringement or infringement under the doctrine of equivalents.12 The interpretation step is said to be a question of law,13 while the application step is said to be a question of fact.14

Given that the Federal Circuit's basis for distinguishing between "structural" equivalents under § 112, ¶ 6 and equivalents under

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10 Id. at 400, 155 U.S.P.Q. (BNA) at 704-05.
the doctrine of equivalents lies in differences in the respective analytical frameworks, it would seem instructive to compare the two analyses at the most fundamental level, in the context of the two-step infringement analysis. That is, is the equivalency analysis under § 112, ¶ 6 properly characterized as interpretation of a means-plus-function element, or as application of that claim element to the accused device? Similarly, is the equivalency analysis under the doctrine of equivalents interpretation or application?

Federal Circuit precedent unfortunately provides little guidance. As to the doctrine of equivalents, some cases designate the inquiry as interpretation,\textsuperscript{16} while others designate the inquiry as application.\textsuperscript{6} By contrast, Federal Circuit cases assume that the § 112, ¶ 6 inquiry is interpretation.\textsuperscript{7}

The characterization is important because specific consequences flow from it. For example, if the § 112, ¶ 6 inquiry really is interpretation, then one might expect the exercise of applying § 112, ¶ 6 to be denominated a question of law. But the Federal Circuit has indicated that the determination of § 112, ¶ 6 equivalents is a question of fact,\textsuperscript{16} just as the equivalents inquiry under the doctrine of equivalents is a question of fact.\textsuperscript{19}

In addition, one might expect that if the § 112, ¶ 6 exercise is truly interpretation, the exercise would not vary over time.\textsuperscript{20} Yet the Federal Circuit has stated that the determination of

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\textsuperscript{16} See Carman Indus., Inc. v. Wahl, 724 F.2d 932, 942, 220 U.S.P.Q. (BNA) 481, 489 (Fed. Cir. 1983) (applying the doctrine of equivalents inquiry is a matter of claim interpretation).


\textsuperscript{20} Of course, the patent law does recognize the meaning of a claim term can change over time and it tolerates the resultant conceptual difficulties. See Phillips Petroleum Co. v. United States Steel Corp., 673 F. Supp. 1278, 6 U.S.P.Q.2d (BNA) 1065 (D. Del. 1987), aff'd, 865 F.2d 1247, 9 U.S.P.Q.2d (BNA) 1461 (Fed. Cir. 1989).
equivalents under § 112, ¶ 6 is to be made at the time of the infringement: "[i]t is not required that those skilled in the art knew, at the time the patent application was filed, of the asserted equivalent means of performing the claimed functions . . . ."¹ This presents an interesting wrinkle in the debate over the applicability of § 112, ¶ 6 to ex parte patentability determinations.² If a § 112, ¶ 6 equivalents analysis must be made as part of the patentability determination, equivalents clearly must be determined as of the time the invention was made, not as of the time of a future "infringement." One commentator has gone so far as to suggest that this apparent anomaly justifies—indeed, requires—recognition of § 112, ¶ 6 equivalents and "doctrine of equivalents" equivalents as "different concepts."³

In any event, equivalency under § 112, ¶ 6 and under the doctrine of equivalents is said to be determined at the time of the infringement. The patent owner is not expected to "predict all future developments which enable the practice of his invention in substantially the same way."⁴ At this fundamental level, then, precedent offers no "bright line" distinction between § 112, ¶ 6 equivalents and doctrine of equivalents equivalents. Until precedent on this point is clarified, the distinction between the types of equivalents cannot be justified on the notion that one arises from "interpretation" and the other from "application."


B. Section 112, ¶ 6 and the Doctrine of Equivalents: Analytical Foundations

Courts have interpreted § 112, ¶ 6 as setting forth an analysis for the literal meaning of a means-plus-function element of a claim.25 Thus, § 112, ¶ 6 is pertinent to a determination of literal infringement. By the statute’s plain language, a means-plus-function element “covers” the means disclosed in the specification for performing the claimed function and “equivalents” thereof.26

The Federal Circuit has fashioned a two-step analysis27 for § 112, ¶ 6 determinations under which a means-plus-function element is literally met in an accused device if the device: (1) performs the identical function claimed for the means element;28 and (2) performs that function using the structure disclosed in the specification or an equivalent structure.29 Both steps are necessary to the analysis. That is, a finding that some structure in the accused device performs the claimed function cannot, ipso facto, lead to a finding that the structure in the accused device is “equivalent” to the disclosed means, for to so hold would read § 112, ¶ 6 out of existence.30

The Federal Circuit has opined that in determining structural equivalency under § 112, ¶ 6, the court is free to use the aids used “in interpreting any other type of claim language, namely, the specification, the prosecution history, other claims in the patent, and expert testimony.”31 As to the use of other claims, however, the Federal Circuit has cautioned that where application of the

26 See supra note 2.
31 Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821, 842-43, 20 U.S.P.Q.2d (BNA) 1161, 1179-80 (Fed. Cir. 1991). This follows naturally from the court's assumption that the application of § 112, ¶ 6 is part of the exercise of interpretation, the first prong of the infringement analysis. See supra note 17 and accompanying text.
statute gives a result that would appear to violate the judicially developed doctrine of claim differentiation, the statute will control.\textsuperscript{32}

To summarize, a § 112, ¶ 6 equivalence determination requires comparison between the accused device and the structure disclosed in the patent specification for performing the identical function claimed in a means-plus-function claim element.

By contrast, the modern doctrine of equivalents involves the well-known \textit{Graver Tank} tripartite test under which infringement may be found if the claimed and accused devices perform \textit{substantially the same} overall function, in substantially the same way, to achieve substantially the same overall result.\textsuperscript{33} That is, the doctrine of equivalents inquiry requires comparison between the accused device and the claimed invention, not the disclosed embodiment of the claimed invention as in the case under § 112, ¶ 6.\textsuperscript{34}

In distinguishing the two analytical frameworks for equivalence, the Federal Circuit has emphasized that the § 112, ¶ 6 equivalence determination only becomes relevant when \textit{identity} of function between the accused structure and the claimed function is established. "If the required function is not performed \textit{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."\textsuperscript{35} Presumably, this means that while literal infringement of a claim containing a means-plus-function element cannot be found when

\textsuperscript{32} \textit{Laitram}, 939 F.2d at 1538, 19 U.S.P.Q.2d (BNA) at 1371. The court ruled that "[a] means-plus-function limitation is not made open-ended by the presence of another claim specifically claiming the disclosed structure which underlies the means clause or an equivalent of that structure." \textit{Id.}, 19 U.S.P.Q.2d (BNA) at 1371. Otherwise, opined the court, one could escape the restriction of § 112, ¶ 6 "by merely adding a claim or claims specifically reciting such structure or structures." \textit{Id.}, 19 U.S.P.Q.2d (BNA) at 1371. The doctrine of claim differentiation is articulated in \textit{SRI Int'l v. Matsushita Elec. Corp. of Am.}, 775 F.2d 1107, 1121, 227 U.S.P.Q. (BNA) 577, 586-87 (Fed. Cir. 1985) (en banc).


\textsuperscript{34} \textit{Pennwalt Corp. v. Durand-Wayland, Inc.}, 833 F.2d 931, 934, 4 U.S.P.Q.2d (BNA) 1737, 1739 (Fed. Cir. 1987) (en banc) (emphasis added), \textit{cert. denied}, 485 U.S. 961 (1988) ; see also \textit{Manzo, supra} note 25, at 109 (noting that the test announced in \textit{D.M.I.} for § 112, ¶ 6 equivalency did not include the word "substantially").
the accused structure does not perform the identical function claimed, infringement under the doctrine of equivalents may be found if the accused structure performs an equivalent function, so long as the “way” and “result” prongs are also satisfied. That is, the doctrine of equivalents can be “applied over” the § 112, ¶ 6 equivalence analysis. Viewed in this light, the § 112, ¶ 6 equivalence analysis and the doctrine of equivalents analysis would indeed seem to involve fundamentally different comparisons.

Closer scrutiny, however, reveals that the differences, though significant, are not nearly as great as they might appear. In fact, the § 112, ¶ 6 type equivalency analysis shares a common ancestry with the doctrine of equivalents. In Winans v. Denmead, the patent claims at issue incorporated by reference the structure disclosed in the specification by using the then-common phrase “substantially as herein described.” In construing the claims, the Court was faced with the issue of whether to limit the claim to the precise structure disclosed in the specification as the literal language required. The Court refused to do so, explaining that the claim would be construed to cover “the precise forms . . . which embody [the] invention” as well as copies of “the principle or mode of operation described,” even if “totally unlike the original in form or proportions.” This principle—that claims could be construed to cover the preferred embodiment described in the specification plus equivalents thereof—came to be known as the doctrine of equivalents and eventually evolved into the Graver Tank-oriented doctrine invoked today.

Clearly, then, the concept of comparing accused structure with structure disclosed in the specification and equivalents thereof, a concept now embodied in § 112, ¶ 6, was not invented by the drafters of that provision. Rather, it mirrors historical concepts of the doctrine of equivalents. To be sure, this does not justify ignoring the modern reality of distinct analytical regimes for § 112, ¶ 6 equivalents and the doctrine of equivalents. However, the concept does cast suspicion on the assertion that the two re-


56 U.S. (15 How.) 330 (1853).

Id. at 331.

Id. at 340.

Id. at 342.

See supra note 32 and accompanying text.

See Winans, 56 U.S. (15 How.) at 342.

Id.
gimes inevitably produce fundamentally different varieties of "equivalents." As demonstrated in the following section, analogy between § 112, ¶ 6 and the reverse doctrine of equivalents, also commonly articulated as a justification for distinguishing between § 112, ¶ 6 and the doctrine of equivalents, befalls a similar fate when carefully scrutinized.

C. Section 112, ¶ 6 as a Codification of the Reverse Doctrine of Equivalents

By the plain language of the § 112, ¶ 6, a means-plus-function clause "does not cover [for infringement purposes, at least] every means for performing the specified function." Thus, § 112, ¶ 6 permits functional claiming, but "operates to cut back on the types of means which could literally satisfy the claim language." The doctrine of equivalents, by contrast, is a doctrine of expansion. Specifically, according to Judge Rich, application of the doctrine leaves the claims themselves undisturbed, but "expands the right to exclude 'equivalents' of what is claimed."

The observation that § 112, ¶ 6 is a restrictive doctrine has led courts and commentators alike to analogize § 112, ¶ 6 to the reverse doctrine of equivalents. As put by Professors Adelman and Francione:

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44 For a definition of the reverse doctrine of equivalents, see supra note 21 and accompanying text.
45 E.g., Laitram Corp. v. Revmord, Inc., 939 F.2d 1533, 1536, 19 U.S.P.Q.2d (BNA) 1367, 1370 (Fed. Cir. 1990). The issue of whether § 112, ¶ 6 applies in the context of ex parte patentability determinations is beyond the scope of this Article.
48 Id., 14 U.S.P.Q.2d (BNA) at 1948.

[W]here a device is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way, but nevertheless falls within the literal words of the claim, the doctrine of equivalents may be used to restrict the claim and defeat the patentee's action for infringement.

The reference to the "equivalents" in section 112, paragraph 6, should mean that functional elements in combination claims are literally readable if the claim language applies, when it is properly construed in keeping with the specification and prosecution history, but the actual infringement is not present when . . . the accused device has a functionally defined element that functions in a substantially different manner from the corresponding element disclosed in the specification.50

Adelman and Francione go so far as to suggest that a means-plus-function element could be correctly construed to cover all means for performing the claimed function, and that the reverse doctrine of equivalents could then be applied to cut back the means-plus-function element in scope where justified.51

This approach, while satisfying from a theoretical perspective, confounds the plain language of § 112, ¶ 6.52 More importantly, however, the analogy between § 112, ¶ 6 and the reverse doctrine of equivalents is superficial because it ignores placement of the burden of proof. The burden of proving § 112, ¶ 6 equivalence is borne, of course, by the patentee as part of his infringement showing.53 The reverse doctrine of equivalents, by contrast, is a "doctrine of non-equivalence,"54 the proof of which falls to the alleged infringer.55 Given the Federal Circuit's reluctance to rely upon the reverse doctrine, and given the complexities inherent in proving equivalence whatever the analytical regime, the allocation of the burden of proof as to equivalence may be outcome determinative.

While there is no denying that the restrictive principle embodied in § 112, ¶ 6 mimics that of the reverse doctrine of equivalents, the analogy ends there. The analogy lends little, if any, support to the proposition that § 112, ¶ 6 equivalency should be distinguished

50 Adelman & Francione, supra note 21, at 725.
51 Id. As Adelman and Francione have acknowledged, the Federal Circuit has rejected this approach. Id. n.223.
52 See supra note 2.
from equivalency under the doctrine of equivalents.

D. Policies Underlying § 112, ¶ 6 Equivalency and Equivalency Under the Doctrine

The equivalency analysis under § 112, ¶ 6 is obviously grounded in statute.\textsuperscript{56} The doctrine of equivalents is a doctrine "judicially devised to do equity,"\textsuperscript{57} whose essence is to prevent one from practicing "a fraud on a patent."\textsuperscript{58} As Judge Learned Hand explained, courts resort to the doctrine of equivalents "to temper unsparing logic and prevent an infringer from stealing the benefit of the invention."\textsuperscript{59}

The equivalency analysis under § 112, ¶ 6 is \textit{required} for analysis of literal infringement of a claim containing a means-plus-function element (assuming that the accused structure is not exactly the same as the disclosed means). The doctrine of equivalents is \textit{not} a required component of every infringement analysis; indeed, it is said to be the exception, not the rule.\textsuperscript{60} It is applied on the equities in response to the wiles of the "unscrupulous copyist"\textsuperscript{61} for whom "[o]utright and forthright duplication is a dull and very rare type of infringement."\textsuperscript{62} As a typical equitable doctrine, it is not the "prisoner of a formula and is not an absolute to be considered in a vacuum";\textsuperscript{63} rather, it operates to avoid "plac[ing] the inventor at the mercy of verbalism"\textsuperscript{64} and "subordinating substance to form,"\textsuperscript{65} the result of which would be "to convert the protection of

\textsuperscript{56} See supra note 2.
\textsuperscript{58} Graver Tank, 339 U.S. at 607-08, 85 U.S.P.Q. (BNA) at 330.
\textsuperscript{61} Graver Tank, 339 U.S. at 607, 85 U.S.P.Q. (BNA) at 330.
\textsuperscript{62} Id., 85 U.S.P.Q. (BNA) at 330.
\textsuperscript{63} Id. at 609, 85 U.S.P.Q. (BNA) at 330.
\textsuperscript{64} Id. at 607, 85 U.S.P.Q. (BNA) at 330.
\textsuperscript{65} Id., 85 U.S.P.Q (BNA) at 330.
the patent grant into a hollow and useless thing.”

It therefore might be tempting to conclude (as the Federal Circuit expressly did in Valmont) that § 112, ¶ 6 and the doctrine of equivalents have “separate purposes.” It takes little imagination, however, to discern a common balance of policies underlying both § 112, ¶ 6 and the doctrine of equivalents.

As to the doctrine of equivalents, the Federal Circuit has observed that:

On the one hand, claims must be “particular” and “distinct” as required by 35 U.S.C. § 112, so that the public has fair notice of what the patentee and the Patent and Trademark Office have agreed constitute the metes and bounds of the claimed invention . . . . On the other hand, the patentee should not be deprived of the benefits of his patent by competitors who appropriate the essence of an invention while barely avoiding the literal language of the claims.

Judge Bennett, dissenting in Pennwalt, had previously noted that

[t]he current case presents, as did Graver Tank and as does any case involving the doctrine of equivalents, a choice between conflicting policies. On the one hand, there is the historic right of affording the public fair notice of what the patentee regards as his claimed invention in order to allow competitors to avoid actions which infringe the patent . . . . On the other hand . . . is the policy of affording the patent owner complete and fair protection of what was invented.

The court seems inclined to vacillate quite dramatically on balancing these policies. Judging by its more recent pronouncements, the policy of ensuring fair notice by reasonable claim
particularity may have the upper hand today.\textsuperscript{72}

Precisely this same balancing is embodied in all of § 112, and especially in § 112, ¶ 6. Prior to the enactment of § 112, ¶ 6, claims including means-plus-function language were routinely held invalid for indefiniteness.\textsuperscript{73} Section 112, ¶ 6 overruled these decisions.\textsuperscript{74} But the provision does not—by its plain language, in any event—allow unbridled functional claiming.\textsuperscript{76} Rather, § 112, ¶ 6 allows patentees to express claims in the shorthand of functional language while simultaneously requiring that the claim language be linked to disclosed structure.\textsuperscript{76}

Ultimately, then, § 112, ¶ 6 and the doctrine of equivalents have parallel purposes. This is not to suggest, however, that the equivalency exercise under § 112, ¶ 6 must, like that under the doctrine of equivalents, involve the application of equity. Indeed, if the Federal Circuit determines that the \textit{Graver Tank} test is subject to a separate equitable determination and does not itself represent the application of equity, then similarity between \textit{Graver Tank} equivalency and § 112, ¶ 6 equivalency will become even more plain. In any event, the distinction between § 112, ¶ 6 equivalency and equivalence under the doctrine cannot be justified on the basis of some perceived difference in “purpose.”

II. \textbf{E}LEMENTAL E\textbf{QUIVALENCE UNDER § 112, ¶ 6 AND THE DOCTRINE OF EQUIVALENTS}

\textbf{A. Elemental Equivalence as Defined Under the Doctrine of Equivalents}

The doctrine of equivalents applies to an entire claim to determine infringement; section 112, ¶ 6 equivalents pertain only to a

\textsuperscript{72} \textit{London}, 946 F.2d at 1538, 20 U.S.P.Q.2d (BNA) at 1458-59.

\textsuperscript{73} \textit{See}, e.g., Halliburton Oil Well Cementing Co. v. Walker, 329 U.S. 1, 12-13, 71 U.S.P.Q. (BNA) 175, 179-80 (1946).

\textsuperscript{74} Ronald D. Hantman, \textit{Patent Infringement}, 72 J. PAT. & TRADEMARK OFF. SOC'y 454, 487 (1990) (citing P.J. Federico's commentary found in the 1954 edition of 35 U.S.C.A. at 25 (West)). Federico's views, although they are not technically legislative history, are normally accepted as authoritative. \textit{Id.} at 486. Other relevant portions of legislative history are set forth in Hantman, \textit{supra}.


\textsuperscript{78} \textit{See id.} at 547, 113 U.S.P.Q. (BNA) at 533.
means-plus-function element of a claim. However, in its recent jurisprudence, the Federal Circuit has articulated a concept of elemental equivalence under the doctrine of equivalents. While its contours are not clear, and will likely never be the subject of "a formula of general applicability," elemental equivalence under the doctrine of equivalents provides a clear basis for comparison to § 112, ¶ 6 equivalents.

Under the concept of elemental equivalence, the Graver Tank tripartite test is applied on an element-by-element basis, at least as to the "way" prong: the "substantially the same way" prong of this test may be met if an equivalent of a recited limitation has been substituted in the accused device.

More recently, one panel of the Federal Circuit demonstrated adamant allegiance to the concept of elemental equivalence by promising that

\[\text{[a]s a matter of terminology under the doctrine of equivalents, we will speak only of infringement of a claim and of an equivalent to a limitation . . . . Specifically, we avoid speaking of "equivalency" between the accused device and the patented invention. To speak of "equivalency" to the invention creates confusion and is technically inaccurate . . . . Equivalency to limitations of the claim must be the focus of the inquiry . . . .} \]

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77 This has given rise to such vague statements as: "Under the doctrine of equivalents, however, each [element or limitation] is viewed in the context of the entire claim," in contrast to §112, ¶ 6 equivalents. Sun Studs, Inc. v. ATA Equip. Leasing, Inc., 872 F.2d 978, 989, 10 U.S.P.Q.2d (BNA) 1338, 1347 (Fed. Cir. 1989).

78 Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 949, 4 U.S.P.Q.2d (BNA) 1737, 1752 (Fed. Cir. 1987) (en banc) (Nies, J., additional views) ("[W]hen an element is entirely missing, that is, when the accused device does not contain either the exact element of the claim or its equivalent, there is no infringement. Conversely, an element is not 'missing' if an equivalent has been substituted."). cert. denied, 485 U.S. 961 (1988). Judge Nies concluded that:

the term 'equivalents' in the 'doctrine of equivalents' refers to 'equivalents' of the elements of the claim, not 'equivalents' of the claimed invention. While a device found to be an infringement under the doctrine of equivalents is, in a sense, 'equivalent' to the claimed invention, that conclusion follows from application of the doctrine. It is not the equivalency determination to which the doctrine is directed, but the result thereof. To speak of a device as being an 'equivalent' of the patented invention muddles the analysis.

Id. at 953, 4 U.S.P.Q.2d (BNA) at 1752.


80 Id., 21 U.S.P.Q.2d (BNA) at 1165.

As commentators have noted, despite the furor over the proper analytical approach to the doctrine of equivalents, little guidance has been given as to the key underlying question of what is an "equivalent" to a limitation.\textsuperscript{82} The case law, however, yields a variety of formulations.

The Federal Circuit has validated the use of a subsidiary function/way/result analysis directed to claim limitations:

This court has not set out in its precedent a definitive formula for determining equivalency between a required limitation or combination of limitations and what has allegedly been substituted therefor in the accused device . . . . We note that the district court resolved the question by . . . a subsidiary analysis comparable to the overall function/way/result analysis mandated for determining infringement under the doctrine of equivalents . . . . The district court's "function/way/result" equivalency analysis appears to be a helpful way to approach the problem and is entirely in accord with the analysis actually made in \textit{Graver Tank} . . . .\textsuperscript{83}

However, the Federal Circuit avers that it has "never adopted the three prong approach to determining equivalency of a \textit{limitation}."\textsuperscript{84} In other words, "while comparison of function/way/result is an \textit{acceptable} way of showing that structure in an accused device is the 'substantial equivalent' of a claim limitation, it is not the only way to do so . . . ."\textsuperscript{85}

Perhaps most prominent among the various formulations for elemental equivalency is the "interchangeability" criterion. "An important factor [in defining an equivalent] is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was,"\textsuperscript{86} giving full "consideration . . . to the purpose for which an ingredient is used in a patent, the qualities it has when combined with other ingredients, and the function which it is intended to perform."\textsuperscript{87} The interchangeability criterion applies even when

\textsuperscript{82} See Adelman & Francione, \textit{supra} note 21, at 678-79 ("In many respects, the choice of an element-by-element or entirety approach has little consequence for a fact-finder seeking guidance in answering the real question at issue: What is an 'equivalent'?").


\textsuperscript{84} \textit{Malta}, 952 F.2d at 1325, 21 U.S.P.Q.2d (BNA) at 1165.

\textsuperscript{85} \textit{Id.} at 1326, 21 U.S.P.Q.2d (BNA) at 1165 (emphasis added).


\textsuperscript{87} \textit{Id.}, 85 U.S.P.Q. (BNA) at 331.
only future technological developments unanticipated by the patent owner impart or enable the interchangeability. That is, "variations in the invention, made possible by subsequent advances in the art, do not allow the accused infringing device to escape the 'web of infringement.'"88 Foreseeable interchangeability, of course, will typically constitute strong evidence of equivalence.89

Although the interchangeability criterion is important, at least one recent Federal Circuit case suggests that interchangeability is not the sine que non of elemental equivalency. "An interchangeable device is not necessarily an equivalent device,"90 where, for example, the asserted range of equivalency, notwithstanding interchangeability, would encompass the prior art.

Other formulations that do not appear to be analytically distinct from the "interchangeability" criterion also appear in the Federal Circuit's opinions. For example, the Federal Circuit may find equivalency on the basis of an "insubstantial change" or an "insubstantial substitution."91 Likewise, the Federal Circuit may base equivalency upon finding a "minor modification."92

Interestingly, the court has also hinted that equivalence may arise when structure in an accused device is but an obvious variation of claimed structure,93 extending the patent law axiom: "that which would literally infringe if later in time anticipates if earlier

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93 Judge Nies has observed that "[s]ome infringements may be infringements under the doctrine of equivalents which, if one wished to draw a parallel, is somewhat akin to obviousness." Lewmar Marine, Inc. v. Barent, Inc., 827 F.2d 744, 748, 3 U.S.P.Q.2d (BNA) 1766, 1768 (Fed. Cir. 1987), cert. denied, 484 U.S. 1007 (1988).
than the date of invention."\textsuperscript{94} However, for a claim A B C, and an accused product A B C', the court has also held that C' may be equivalent to C even if C' is an unobvious improvement over C.\textsuperscript{95} The important inquiry is whether adding C' to the combination gives unexpected results, as this may indicate whether the "substantially the same result" prong is met.\textsuperscript{96}

Plainly, then, if precedent reveals that courts are relying upon a subsidiary \textit{Graver Tank} function/way/result analysis, or other common equivalency formulations developed under the doctrine of equivalents, to determine equivalent means under § 112, ¶ 6, it would be difficult to rationalize the distinction between the § 112, ¶ 6 equivalents and equivalents under the doctrine at the level of elemental equivalence.

\textbf{B. Elemental Equivalence as Applied to § 112, ¶ 6 Equivalents}

The Federal Circuit has stated explicitly that a modified \textit{Graver Tank} tripartite test is applicable to § 112, ¶ 6 equivalence determinations:

Whether the issue is equivalency of a means that is described in the specification to perform a function in a "means" clause of a combination claim (\textit{i.e.}, literal infringement), or equivalency to the claimed invention as a whole (\textit{i.e.}, infringement by the \textit{doctrine} of equivalents), the test is the same three-part test of history: does the asserted equivalent perform substantially the same function in substantially the same way to accomplish substantially the same result. (In the case of "means" clauses, of course, the function is that stated in the claim.)\textsuperscript{97}

On a prior occasion, the Federal Circuit observed that

\textit{[a]}lthough, as we pointed out in \textit{[D.M.I.]}, there is a difference between a doctrine-of-equivalents analysis and a literal infringement analysis involving "equivalents" under § 112, \textit{Graver Tank} concepts


\textsuperscript{96} Atlas, 750 F.2d at 1580 n.3, 224 U.S.P.Q. (BNA) at 417 n.3.

\textsuperscript{97} Texas Instruments, Inc. v. United States Int'l Trade Comm'n, 805 F.2d 1558, 1571, 231 U.S.P.Q. (BNA) 833, 841 (Fed. Cir. 1986).
of equivalents are relevant in any "equivalents" determination. The fact that Graver Tank preceded the 1952 Patent Act by two years and the last paragraph of § 112 was new suggests that the underlying principles of equivalents in Graver Tank could be used in a § 112 literal infringement analysis.98

Moreover, the application of Graver Tank to § 112, ¶ 6 equivalency determinations predates the Federal Circuit. For example, in Lockheed Aircraft Corp. v. United States,99 the Court of Claims analyzed § 112, ¶ 6 equivalents by considering whether the circuits in the accused device and those exemplified in the patent functioned "in substantially the same manner to achieve substantially the same result . . . ."100 In Hale Fire Pump Co. v. Tokai, Ltd.,101 the United States Court of Customs and Patent Appeals explicitly relied upon a Graver Tank analysis to determine § 112, ¶ 6 equivalency.102 Another illustrative case in point is Stearns v. Tinker & Rasor,103 which clearly uses Graver Tank language in a § 112, ¶ 6 equivalency analysis.104

Applying to these cases the gloss of Pennwalt and Corning Glass, one derives the rule that a subsidiary function/way/result analysis—or, rather, a subsidiary way/result analysis, since function must be identical—should be applicable to determining § 112, ¶ 6 equivalents. The Federal Circuit's rejection of this approach recently in Valmont is disturbing.105

More importantly, however, the "interchangeability" criterion has been expressly accepted by the Federal Circuit as a "useful consideration" in the context of § 112, ¶ 6 equivalents.106 Even in Valmont, the court applies the "insubstantial change" considera-

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98 Palumbo v. Don-Joy Co., 762 F.2d 969, 975 n.4, 226 U.S.P.Q. (BNA) 5, 8 n.4 (Fed. Cir. 1985) (citations omitted). Curiously, the court went on to note that the doctrine of equivalents "is distinct and can be different from" § 112, ¶ 6 equivalents because the latter arose in the context of a literal infringement determination. Id. n.4, 226 U.S.P.Q. (BNA) at 8 n.4.


100 Id. at 79, 193 U.S.P.Q. (BNA) at 458.


103 252 F.2d 589, 116 U.S.P.Q. (BNA) 222 (9th Cir. 1957).

104 Id. at 599-600, 116 U.S.P.Q. (BNA) at 229-31.

105 See supra note 95 and accompanying text.

tion to both the doctrine of equivalents and § 112, ¶ 6 equivalence analyses. The two types of equivalents are indistinguishable at this level of abstraction.

Furthermore, the concept of elemental equivalency also exposes weaknesses in another apparent analytical distinction between § 112, ¶ 6 and the doctrine of equivalents. It is well established that the doctrine of equivalents is limited in that infringement cannot be found when the asserted scope of equivalency would encompass the prior art. The doctrine is also limited in that it will not allow the patent owner to recapture through equivalence that which was given up during prosecution. On the other hand, the Federal Circuit has held that § 112, ¶ 6 equivalents are not limited by the prior art because § 112, ¶ 6 pertains to discrete claim limitations which “may, and often do, read on the prior art.” On this basis, the Federal Circuit posited a distinction between § 112, ¶ 6 equivalents and doctrine of equivalents equivalents:

In Texas Instruments this court suggested, in dicta, that there might be some similarities between the equivalence analysis under section 112, paragraph 6, and the application of the doctrine of equivalents. That case did not suggest, however, that the prior art should be considered in determining literal satisfaction of a means-plus-function claim limitation.

However, the observation that § 112, ¶ 6 equivalents are elemental, and thus not limited by the prior art, should logically apply equally to elemental equivalence under the doctrine. Indeed, the Federal Circuit has stated that an elemental equivalent under the doctrine of equivalents is not necessarily limited by the prior art, because “[n]othing is taken from the ‘public domain’ when the is-

111 Intel, 946 F.2d at 843, 20 U.S.P.Q.2d (BNA) at 1180 (citation omitted).
sue of equivalency is directed to a limitation only, in contrast to the entirety of the claimed invention.”

Thus, the apparent distinction articulated in Intel breaks down when § 112, ¶ 6 equivalents and doctrine of equivalents equivalents are compared at the elemental level.

Prior to the Federal Circuit’s adoption of the elemental approach to the doctrine of equivalents in Pennwalt, Edward Manzo observed that:

If the tests for a Section 112 equivalent and a doctrine of equivalents equivalent each follow the Graver Tank guidelines, it is difficult to rationalize the need for the distinction announced by the Federal Circuit [in D.M.I.] between these “equivalents.”

Plainly, the observation is even more true now that the Federal Circuit has articulated the concept of elemental equivalence under the doctrine of equivalents.

III. Valmont and the Intersection of § 112, ¶ 6 Equivalents and the Doctrine of Equivalents

The Federal Circuit recently had the opportunity to clarify its precedent regarding the intersection between § 112, ¶ 6 and the doctrine of equivalents. While recognizing that “Section 112 and the doctrine of equivalents have something in common,” in that both invoke the familiar concept of insubstantial change, the court nonetheless perpetuated many of the arguments it relied upon in previous cases to justify the distinction between § 112, ¶ 6 equivalents and the doctrine of equivalents. Indeed, the court arguably went further by expressly rejecting the Graver Tank tripartite test in the context of § 112, ¶ 6.

A. The Valmont Case

The patent claims at issue in Valmont related to an apparatus for irrigating a non-circular area that included including a “control
means for operating” a moving means.\textsuperscript{118} The trial court, in finding the claims infringed, concluded that the steering mechanisms on the claimed and accused systems were “equivalent” with regards to the control means.\textsuperscript{119} The trial court had purported to apply the \textit{Graver Tank} tripartite test as follows:

The Court concludes that the means for steering in the two systems are equivalent—that is they are substantially the same function—there’s a control means for operating the moving means . . . .\textsuperscript{120}

Writing for a panel of the Federal Circuit, Circuit Judge Rader first observed that “[a]pparently the district court applied some form of equivalency analysis to find infringement.”\textsuperscript{121} This equivalency analysis might have been “either the equivalency analysis of 35 U.S.C. § 112 . . . or the doctrine of equivalents.”\textsuperscript{122}

The court then compared the two analyses, concluding that:

An equivalent under the doctrine of equivalents results from an insubstantial change which, from the perspective of one of ordinary skill in the art, adds nothing of significance to the claimed invention . . . . In 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.\textsuperscript{123}

The court justified this distinction on familiar grounds. It relied upon the “separate origins” of § 112, ¶ 6 and the doctrine of equivalents,\textsuperscript{124} it likened § 112, ¶ 6 to the reverse doctrine of equivalents,\textsuperscript{125} and it cited the separate “purposes” of § 112, ¶ 6 and the doctrine.\textsuperscript{126} Yet the origins of the § 112, ¶ 6 equivalency concept and the doctrine of equivalents are intertwined,\textsuperscript{127} the analogy to the reverse doctrine of equivalents is strained,\textsuperscript{128} and § 112, ¶ 6 and doctrine of equivalents ultimately have identical purposes.\textsuperscript{129} This timeworn panoply of arguments simply provides

\begin{itemize}
\item \textsuperscript{118} Id. at 1040, 25 U.S.P.Q.2d (BNA) at 1452.
\item \textsuperscript{119} Id. at 1041, 25 U.S.P.Q.2d (BNA) at 1453.
\item \textsuperscript{120} Id., 25 U.S.P.Q.2d (BNA) at 1453.
\item \textsuperscript{121} Id., 25 U.S.P.Q.2d (BNA) at 1453.
\item \textsuperscript{122} Id., 25 U.S.P.Q.2d (BNA) at 1453.
\item \textsuperscript{123} Id. at 1043, 25 U.S.P.Q.2d (BNA) at 1454-55.
\item \textsuperscript{124} Id. at 1043-44, 25 U.S.P.Q.2d (BNA) at 1454-55.
\item \textsuperscript{125} Id. at 1042, 25 U.S.P.Q.2d (BNA) at 1454.
\item \textsuperscript{126} Id. at 1043, 25 U.S.P.Q.2d (BNA) at 1454.
\item \textsuperscript{127} See supra notes 38-43 and accompanying text.
\item \textsuperscript{128} See supra notes 52-55 and accompanying text.
\item \textsuperscript{129} See supra notes 68-76 and accompanying text.
\end{itemize}
no satisfactory foundation for a distinction between § 112, ¶ 6 equivalents and doctrine of equivalents equivalents.

The court did acknowledge that both equivalency determinations involve the notion of "insubstantial change,"¹³⁰ but then proceeded to undercut this correct statement by refusing to accept the use of Graver Tank principles under § 112, ¶ 6: "A determination of section 112 equivalence does not involve the equitable tripartite test of the doctrine of equivalents."¹³¹

It is true that the Graver Tank tripartite test does not apply per se in equivalency determinations under § 112, ¶ 6, given the court's holding that the § 112, ¶ 6 analysis calls for identity of function while the Graver Tank test calls for mere substantial similarity.¹³² It might also be said that the § 112, ¶ 6 analysis refers to the function of the means-plus-function element alone, while the tripartite test refers to the overall function performed by the device, although when a subsidiary tripartite test is applied to determine equivalency of a limitation, it is difficult to see any distinction between the two "functions."¹³³

The court's statement, then, may be correct in the sense that the "function" prong is inapplicable to § 112, ¶ 6 equivalency determinations without ruling out the possibility that the "way" and "result" prongs of Graver Tank are applicable to such determinations. If this is what the court meant to say, the court's apparent outright rejection of the use of the Graver Tank test is tremendously misleading and is almost certain to cause confusion, particularly given that most equivalency determinations center

¹³⁰ Valmont, 983 F.2d at 1043, 25 U.S.P.Q.2d (BNA) at 1455.
¹³¹ Id., 25 U.S.P.Q.2d (BNA) at 1455.
¹³² D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1575, 225 U.S.P.Q. (BNA) 236, 239 (Fed. Cir. 1985); see also Adamo, supra note 23, at 594 (the § 112, ¶ 6 equivalent "is one of identity of function, not 'substantial' identity, which is the hallmark of the doctrine of equivalents"). But the Federal Circuit has already recognized this in Texas Instruments. See supra note 54 and accompanying text.
¹³³ Judge Nies has attempted to draw this distinction, curiously enough, in the context of defending the element-by-element approach to the doctrine of equivalents:

Part of the misreading of Hughes is apparently due to the double "function" inquiry-one being the overall function [work] of the device; the other the function of the means-plus-function element. The "function" in the function/way/result test of Graver Tank is not the "function" of a single means element. The latter is part of the inquiry into whether the accused device works in the "same way."

about the "way" prong. Most courts and litigators will read the statement for what it says on its face—that no portion of the *Graver Tank* test can be used for § 112, ¶ 6 determinations. Moreover, the court's statement simply fails to account for precedent. The great weight of precedent from the Federal Circuit and its predecessor courts explicitly establishes that *Graver Tank* concepts are relevant to § 112, ¶ 6 equivalency. With no citation to—let alone explanation of—this contrary precedent, the *Valmont* court endorsed the premise from *D.M.I.* that § 112, ¶ 6 equivalents and the doctrine of equivalents are not to be "confused." Unfortunately, this is but another example of the Federal Circuit speaking "with at least a slightly forked tongue" on the relationship between the doctrine of equivalents and § 112, ¶ 6.

**B. Analysis and Recommendation**

There is simply no sound justification for refusing to apply *Graver Tank* principles to the § 112, ¶ 6 equivalency determination. In future cases, the Federal Circuit should make clear that the "substantially the same way" prong is applicable to § 112, ¶ 6 equivalency. Structure in an accused device that performs exactly the claimed function and works in substantially the same way as the disclosed means should be found to be a § 112, ¶ 6 equivalent to that means.

This formulation is useful because it eliminates the artificial distinction between § 112, ¶ 6 "structural" equivalents and equivalents under the doctrine. Moreover, the formulation is particularly appropriate given the Federal Circuit's use of the subsidiary "substantially the same way" prong in determining elemental

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134 "[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." *Id.* at 940 n.3, 4 U.S.P.Q.2d (BNA) at 1744 n.3. (Bennett, J., dissenting); *see also* Slimfold Mfg. Co. v. Kinkead Indus., Inc., 932 F.2d 1453, 1457, 18 U.S.P.Q.2d (BNA) 1842, 1846 (Fed. Cir. 1991).

135 *See supra* note 97 and accompanying text.


138 The patentee should also be compelled to explain why the accused structure and the disclosed means are substantially the same in way in accordance with *Malta v. Schulmerich Carillons*, especially in the jury trial setting. *See* Janis, *supra* note 13, at 649.
Finally, this formulation expressly allows courts to avail themselves of the concepts of "insubstantial change," "interchangeability," and even "obvious variation," all of which are brought in under the umbrella of the "way" prong. Even the Valmont court relied upon these concepts. The court could simplify matters by expressly reaffirming precedent validating the use of Graver Tank concepts for § 112, ¶ 6 equivalency. Differences in the respective analytical regimes for § 112, ¶ 6 equivalents and the doctrine of equivalents do not support distinct concepts of § 112, ¶ 6 "equivalents" and doctrine of equivalents equivalents. Until the Federal Circuit makes clear that § 112, ¶ 6 equivalents and equivalents under the doctrine both rely upon Graver Tank principles of substantial sameness of "way," district courts will continue to struggle with the supposedly distinct concepts of equivalents.

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139 See supra note 112 and accompanying text.