

Special Issue: Six Years of the CAFC

**REVIEW OF SELECTED CASES FROM THE CAFC
RELATING TO INFRINGEMENT UNDER THE DOCTRINE
OF EQUIVALENTS AND LITERAL INFRINGEMENT
UNDER PARAGRAPH 6, 35 USC 112**

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I. Introduction

A. Doctrine of Equivalents

The 1836 Patent Act, Ch. 357, 5 Stat. 117, Section 6 (1836) for the first time provided that an applicant for a patent

...shall particularly point out the part, improvement, or combination, which he claims as his own invention or discovery.

Both before and after enactment of the 1836 act, the practice was to claim "the invention in general terms -- often 'substantially as herein described.'" [n.1] The Winans v. Denmead decision by the Supreme Court in 1853 was "the first decision to do serious damage to the literal meaning of the language of a patent claim." [n.2]

The Winans patent pertained to a railroad car for transportation of coal that had a body shaped in the form of a frustrum of a cone to equalize the weight of the coal. The Supreme Court held that octagonal and pyramidal shaped railroad cars infringed Winans' claims. All of the evidence indicated that the defendant's car achieved substantially all the advantages of the Winans car. [n.3]

*254 Thus, the doctrine of equivalents was born in U.S. Patent Law as a tool for interpreting claims. The majority opinion recognized that it would be unreasonable to apply the term "cone" literally and deny the inventor his rights under the patent law. The dissent recognized that the public must be given fair notice of what is being claimed as the invention to prevent "oppressive and costly litigation" and "exorbitant and unjust pretensions and vexatious demands." These competing policies, i.e., fair notice to potential infringers versus equity considerations in preventing imitation of a patented invention which does not copy every literal detail, have plagued courts since the decision in Winans in attempting to decide infringement cases under the doctrine of equivalents.

The Graver Tank [n.4] decision and the line of cases [n.5] which it followed, provided the modern tripartite (function, way, result) test for infringement under the doctrine of equivalents. As the Supreme Court stated in Graver Tank,

[a] patentee may invoke this doctrine to proceed against the producer of a device if it performs substantially the same function in substantially the same way to obtain the same result.

B. Literal Infringement under paragraph 6, 35 USC 112

The 1952 Patent Act specifically authorized the use of means plus function type claims, in what now appears as 35 USC 112, paragraph 6 of the statute.

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. (Emphasis added)

The purpose and scope of this language of the statute has often been confused with the application of the doctrine of equivalents to means plus function type claims, as well as the manner in which literal infringement can be determined under Section 112, paragraph 6.

C. Scope of this Paper

This paper explores the decisions of the United States Court of Appeals for the Federal Circuit (CAFC) with regard to application of the competing policies of notice and equity to determine infringement under the doctrine of equivalents, and the requirements for finding literal infringement*255 under paragraph 6, section 112. [n.6] Specifically, the issue of the "element-by-element comparison" [n.7] test that was used in the Pennwalt case for determining infringement under the doctrine of equivalents is examined in detail to determine the manner in which Pennwalt squares with previous cases decided by the CAFC and the Graver Tank Case.

Additionally, the Pennwalt case carefully defined the role of section 112, paragraph 6 equivalency. Specifically, Pennwalt held that even though an element of the claim is recited in means plus function form, the specification of the patent must disclose the structure of the accused infringing device in order to show literal infringement. Stated differently, not just any means for performing a function is covered by means plus function type claims under section 112, paragraph 6, but only equivalents that are disclosed in the specification. The Pennwalt majority also held that an exact correspondence of the functional limitations of a means plus function type claim to the function of the accused infringing device must also be shown, otherwise equivalency under section 112, paragraph 6 does not apply, and infringement can then only be established under the doctrine of equivalents. The concept of the role of section 112,

paragraph 6 equivalency for means plus function claims, is also traced in this paper through decisions of the CAFC.

II. Cases

PENNWALT CORP. v. DURAND-WAYLAND, INC. [n.8]

The in banc decision in the Pennwalt case is perhaps the most important decision of the United States Court of Appeals for the Federal Circuit (CAFC) to date for setting forth an analytical framework to determine literal infringement under 35 USC 112, paragraph 6, and infringement under the doctrine of equivalents.

The Pennwalt patent pertains to a fruit sorter that is capable of sorting fruit by color, weight or a combination of the two characteristics. The *256 sorter conveys the fruit "along a track having an electronic weighing device that produces an electrical signal proportional to the weight of the item, along with signal comparison means, clock means, position indicating means and discharge means, each of which performs specified functions. The specification describes the details of a hard-wired network consisting of discrete electrical components which perform each step of the claims, e.g., by comparing the signals of the weighing device to reference signals and sending an appropriate signal at the proper time to discharge the item into the container corresponding to its weight." [n.9] As recited in claim 10, fruit is also carried past an optical scanner that produces an electrical signal proportional to the color of the item. "The signals from the weighing device and color sensor are combined and an appropriate signal is sent at the proper time to discharge the item into the container corresponding to its color and weight." [n.10] The specification describes the use of a "hardwired" shift register which continuously indicates the position of the fruit to be sorted while the item is in transit between the optical detection device and the electronic weighing device.

Claim 10 is a representative claim of the Pennwalt patent. [n.11]

An automatic sorting apparatus comprising:

 electronic weighing means for generating a signal proportional to the weight of an item to be sorted,

 first reference signal means for providing a predetermined number of reference signals, the value of each signal being established according to a predetermined criteria,

 first comparison means for comparing the signal generated by said electronic weighing means to the reference signals provided by said first reference signal means,

 optical detection means for generating a signal proportional to the color of an item to be sorted,

 second reference signal means for providing a predetermined number of reference signals, the value of each signal being established according to a predetermined criteria,

 second comparison means for comparing the signal generated by said optical detection means to the reference signal provided by said second reference signal means, and generating a signal therefrom,

clock means for incrementally signalling changes in the position of the item to be sorted,

first position indicating means responsive to a signal from said clock means and said signal from said second comparison means for continuously indicating the position of an item to be sorted while the item is in transit between said optical detection means and said electronic weighing means,

second position indicating means responsive to the signal from said clock *257 means, the signal from said first comparison means and said first position indicating means for generating said signal continuously indicative of the position of an item to be sorted after said item has been weighted, and, scharge means responsive to the signal from said second position indicating means for discharging the item at a predetermined one of a plurality of sorting positions. (emphasis added)

The accused infringing device that is manufactured by Durand-Wayland was known as a "Microsizer" that employs software which sorts fruit by both color and weight. The microprocessor of the Microsizer causes the weight and color data in the Durand-Wayland Microsizer to be stored in memory but not the position of the fruit which is being sorted. Hence, the microsizer device does not track the position of the fruit continuously through the sorter device.

A. Literal Infringement

In examining literal infringement of the means plus function clauses, the court determined that not just any means for performing a function is covered by a means plus function claim under paragraph 6, section 112, but only equivalents that are shown in the specification of the Pennwalt patent. Hence, the court stated:

[t]he statute means exactly what it says: to determine whether a claim limitation is meant literally, where expressed as a means for performing a stated function, the court must compare the accused device with a disclosed structure and must find equivalent structure as well as identity of claim function for that structure. *Palumbo v. Don-Joy Company*, 762 F.2d 969, 975, 226 U.S.P.Q. 5,8 (Fed. Cir. 1985); *DMI, Inc. v. Deeres & Co.*, 755 F.2d 1570, 1575, 225 U.S.P.Q. 236, 239 (Fed. Cir. 1985); *Radio & Steel Manufacturing Co. v. MTD Products, Inc.*, 731 F.2d 840, 848, 221 U.S.P.Q. 657, 663 (Fed. Cir. 1984). [n.12]

The CAFC court further stated that paragraph 6 functions to restrict means plus function clauses in claims to "equivalents" that are disclosed in the patent specification, not just "any and every means which performs the function specified in the claims," [n.13] citing *DataLine Corp. v. Micro Technologies, Inc.*, F.2d 1196, 1201, 1 U.S.P.Q. 2nd 2052, 2055 (Fed. Cir. 1987). [n.14]

The court further stated that if the function of the means plus function clause is not carried out by the accused infringing device exactly, then paragraph 6, section 112 "plays no role" [n.15] in determining equivalency. Hence, in order to find literal infringement, a comparison *258 must be made between the accused infringing device and the structure

disclosed in the specification; and, equivalent structure, as well as identity of the claimed functions for the structure of the accused infringing device, must be found in the specification.

The in banc majority in the Pennwalt case held that the accused Microsizer device ... did not perform the same function as specified in the claim. For example, the district court found that the accused device had no position indicating means which tracked the location of the item being sorted. That finding negates the possibility of finding literal infringement. [n.11]

Hence, the court determined that the Durand-Wayland Microsizer did not perform the function of the position indicating means for continuously tracking the location of the item being sorted and did not have to determine, for the purposes of paragraph 6, section 112, if the software of the Durand-Wayland device was equivalent to the shift register device disclosed in the Pennwalt specification for continuously tracking the location of the fruit. The lack of any structure for performing the recited function of the claim in the accused device negated any possibility of the finding of literal infringement.

B. Infringement Under the Doctrine of Equivalents

The very first statement of the court in addressing infringement under the doctrine of equivalents is that infringement may be found under the doctrine of equivalents using the tripartite (function, way, result) test, but that the doctrine is limited and

... will not extend (1) to cover an accused device in the prior art, and (2) to allow the patentee to recapture through equivalence certain coverage given up during prosecution. *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 870, 228 U.S.P.Q. 90, 96 (Fed. Cir. 1985) [n.16]

citing *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 901-902, 221 U.S.P.Q. 669, 679 (Fed. Cir., cert denied, 469 US 857 [225 U.S.P.Q. 792]); *Graver Tank*, 339 US at 608 [U.S.P.Q. at 330].

The CAFC determined that the District Court found that the microprocessor in the accused device is not programmed to perform the functions of the "first position indicating means" or the "second position indicating means" in that the microprocessor did not produce signals to indicate the continuous location of the fruit. Additionally, the CAFC determined that:

[o]riginally, the claims contained no position indicating means element with the associated functional limitations. The addition of the element was crucial to patentability. A device that does not satisfy this limitation at least *259 equivalently does not function in substantially the same way as the claimed invention. *Perkin-Elmer v. Westinghouse*, 822 F.2d at 1532, 3 U.S.P.Q. 2d at 1324; *Chemical Engineering Corp. v. Essef Industries, Inc.*, 795 F.2d 1565, 1572-73, 230 U.S.P.Q. 385, 390-391 (Fed. Cir. 1986). [n.17]

The CAFC cited the findings of the District Court as follows.

The machine described in the patent in suit uses shift registers to respond to "clock pulses" in order to indicate the various positions of the items to be sorted before each item is discharged. The "Microsizer" does not have any "indicating means" to determine positions of the items to be sorted since the microprocessor stores weight and color data, not the position of the items to be sorted. [n.18]

The CAFC also made the following statement.

The district court found that a memory function is not the same or substantially the same as the function of "continuously indicating" where an item is physically located in a sorter. On this point, the record is indisputable that before the words "continuously indicating" were added as an additional limitation, the claim was unpatentable in view of the prior art which, like the accused machines sorts the information with respect to sorting criteria in memories, but did not "continuously" track the location. [n.19]

It is very clear from the opinion that the functions of continuously indicating the position of the fruit were specifically added to overcome rejections based upon the prior art during the prosecution of the Pennwalt patent. Thus, these functional limitations would appear to fall within the doctrine of file wrapper estoppel which limits the application of the doctrine of equivalents. For example, the court made the following additional statement.

Thus the facts here do not involve later developed computer technology which should be deemed within the scope of the claims to avoid the pirating of the invention. On the contrary, the inventors could not obtain a patent with claims in which the functions were described more broadly. Having secured claims only by including very specific functional limitations, Pennwalt now seeks to avoid those very limitations under the doctrine of equivalents. This it cannot do. [n.20] [footnotes omitted].

The most controversial portions of the Pennwalt decision were contained in the statement of the CAFC that the patent owner "must show the presence of every element or its substantial equivalent in the accused device," [n.21] citing, *Perkin-Elmer v. Westinghouse Electric *260Corp.,supra* and *Lemelson v. United States*, 752 F.2d 1538, 1551, 224 U.S.P.Q. 524, 533 (Fed. Cir. 1985), and the ratification of the "element by element comparison" used by the District Court.

It is clear from this that the district court correctly relied on an element-by-element comparison to conclude that there was no infringement under the doctrine of equivalents, because the accused devices did not perform substantially the same functions as the Pennwalt invention. [n.22]

The dissent strongly objected to the element-by-element analysis and relied upon the decision in *Hughes Aircraft v. United States*, 717, F.2d 1351, 219 U.S.P.Q. 473 (Fed. Cir. 1983).

Judge Nies' "Additional Views" in the Pennwalt case distinguished the *Hughes Aircraft* decision.

The *Hughes* analysis was directed to the confusing concept of equivalency under the doctrine and the different concept of equivalency under Section 112, paragraph 6. When we spoke of the doctrine applying to the "invention as a whole," it was not by implication

or sub silentio rejecting the All Elements Rule. It was subsequently explained that the "statement dealt with infringement inquiry implicating an entire claim, as distinguished from a section 112, paragraph 6 inquiry implicating only a 'means plus function' limitation of a claim." See *Perkin-Elmer*, 822 F.2d at 1532-33, 3 U.S.P.Q. 2nd at 1324-25. As a careful reading of *Hughes* makes clear, the elements of the claim define the metes and bounds of protection, and an equivalent of each element was found in the accused device. [n.23]

In support of the majority opinion, Judge Nies' additional views point out that the "All Elements" rule is a well known principle of patent law, citing 4 D. Chisum, "Patents" 18.03[4](1986). Judge Nies also stated,

[t]hus, when 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. [n.24]

C. Observations Regarding the Pennwalt Decision

The CAFC has clearly defined the role of section 112, paragraph 6 equivalency in means plus function type claims as applying to equivalents that are shown in the specification. The court stated that Paragraph 6, section 112 equivalents are clearly not equivalents that can be found under the doctrine of equivalents. Furthermore, if the function recited in a means plus function type claim is not carried out exactly by the accused device, paragraph 6, section 112 plays no part in determining equivalency under the doctrine of equivalents. If the function *261 is carried out by the accused device and the structure of the accused device is found in the specification of the patent, the accused device will literally infringe, unless lack of infringement is established under the reverse doctrine of equivalents.

The Pennwalt majority also made clear that under the doctrine of equivalents, the presence of every element, or a substantial equivalent, in the accused device, in accordance with the All Elements Rule, must be shown to find infringement.

Additionally, "an element-by-element comparison" is necessary to show infringement under the doctrine of equivalents. The statements of the court were very broad with regard to the "element-by-element comparison." The facts associated with the decision indicated that the elements of the claim that were compared to the accused device had been included in the claim by amendment and could be limited under the doctrine of equivalents by file wrapper estoppel. However, the language of the majority does not even address the issue of the file wrapper estoppel, perhaps indicating that the holding in Pennwalt is intended to cover an element-by-element comparison, even for elements that have not been included under the doctrine of file wrapper estoppel.

HUGHES AIRCRAFT COMPANY v. UNITED STATES [n.25]

The dissent in the Pennwalt case relied upon the Hughes Aircraft [n.21] decision as well as Martin v. Barber [n.26] and Carmen Industries Inc. v. ahl [n.27], in stating that the "element-by-element comparison" departed from the "invention as a whole" standard.

The Hughes case involved a suit for infringement by Hughes against the United States Government for infringement of the Williams patent. Williams, an employee of Hughes, invented a method of positioning synchronous satellites to generate the proper precession to align the synchronous satellite antennas with the Earth. A sun sensor was employed aboard the satellite to determine the orientation of the satellite at any specific moment. The signals representative of the position of the sun with respect to the orientation of the satellite were transmitted to Earth in the Williams patent, and the position of the satellite was calculated so that control signals could be sent back to the satellite to fire attitude jets to establish the correct orientation of the satellite. The U.S. Government's "store and execute" (S/E) satellites used an on-board computer *262 to compute the position of the satellite and generate a control signal to fire the precession jets.

The CAFC found that the S/E satellites infringed the Williams patent under the doctrine of equivalents. Functional language in a means plus function clause of the Williams patent required "providing an indication to a location external to said body (of the satellite) of the instantaneous spin angle of the position of said body (of the satellite)." The CAFC held that this difference in the recited function of the means plus function claim did not result in literal infringement. However, with regard to this clause, the CAFC stated that:

[p]artial variation in technique and embellishment made possible by post- Williams technology, does not allow the accused space craft to escape the "web of infringement." Bendix Corp. v. United States, 600 F.2d 1364, 1382, 204 U.S.P.Q. 617, 631, (Ct. Cl. 1979); Decca Ltd. v. United States, 544 F.2d 1070, 1080-81, 191 U.S.P.Q. 439, 447-448 (Ct. Cl. 1976); Eastern Rotorcraft Corp. v. United States, 397 F.2d at 981, 154 U.S.P.Q. at 45. [n.28]

The court viewed the retention of the position data of the satellite in an on-board computer to be the "modern day equivalent" of providing the position data to ground computers as taught by the Williams patent. The court stated:

[t]he S/E spacecraft and the claimed Williams satellite reflect the precise circumstance envisioned in Graver, supra, they performed the same function (receipt of response to command signals from an external location to accomplish precession), in substantially the same way (jet firings synchronized, albeit later and internally, with ISA position) to obtain substantially the same result (controlled precession of spin axis in a predetermined direction to orient a hovering satellite). [n.29]

The dissent in Pennwalt relied upon the statement in the Hughes decision regarding consideration of the claimed invention "as a whole." As the CAFC majority opinion stated in Hughes in referring to the opinion of the trial judge:

[t]he failure to apply the doctrine of equivalents to the claimed invention as a whole ... was error. [n.26]

Though these statements were made by the court, the Hughes case [n.30] primarily turned on the fact that functions of the Williams claim were relocated from the ground to the S/E satellite. As the court stated at 219 U.S.P.Q. 484:

*263 [t]he difference between the operation by retention and operation by sending is achieved by relocating the function, making no change in the function performed, or in the basic manner of operation, or the result obtained.

The failure of the court to find literal infringement because of the difference in the recited function of the means plus function claim in Hughes directly corresponds to the holding in Pennwalt that exact correspondence between the recited function of a means plus function claim and the function performed by the accused device must be present to find literal infringement.

With regard to infringement under the doctrine of equivalents, the function of sending the information to an external source was not performed by the S/E satellite. Rather, the post-Williams technology embellishments allowed the computations to be made on-board the S/E satellite through the use of an on-board computer. In the Hughes court's opinion, an equivalent function was still performed by the S/E satellite.

Additionally, the facts indicate that the Hughes decision is consistent with an element-by-element analysis since the court considered the only difference between the Williams claims and the S/E Satellite to be a relocation of a single function performed on-board the S/E Satellite. The comparison of a single means plus function clause with the relocated function in the S/E satellite, to determine infringement, is consistent with the element-by-element comparison applied in Pennwalt. Also, the application of the doctrine of equivalents, rather than section 112, paragraph 6 equivalency, because the function of the claim did not "exactly correspond to the function of the S/E satellite, is consistent with the holding in Pennwalt regarding section 112, paragraph 6 equivalency.

PERKIN-ELMER CORP. v. WESTINGHOUSE ELECTRIC CORP. [n.31]

Perkin-Elmer sued Westinghouse for infringing its U.S. Patent 3,873,884. The Perkin-Elmer patent disclosed and claimed an electrodeless discharge lamp (EDL) that used a helical coil that was connected to an RF power supply to generate an electric field sufficient to ionize gas contained within a tube inside the helical coil. The novel and unique feature of the Perkin- Elmer device was that the RF power supply was connected at a tap point on the helical coil so that the coil, which functions essentially as a quarter wavelength antenna, is tuned to the frequency of the RF power supply. Additionally, impedance matching is achieved between the RF power supply and the helical coil by adjusting the tap point to, presumably, cause maximum transference of power to the coil. The accused infringing device, made by Westinghouse, *264 used a transformer type loop coupling arrangement that did not include the functions of coil tuning and impedance matching by positioning a tap on the coil.

Perkin-Elmer argued that its invention was a pioneer invention and consequently should enjoy broad interpretation, since it related to the novel combination of a helical resonator with an electric discharge lamp, which the court referred to as the "two element combination." [n.32]

The CAFC stated that the District Court found that the prior art of record did not show the Perkin-Elmer invention to be a pioneer invention, but rather, "an improved means for providing such light." [n.33]

After determining that the Perkin-Elmer invention was not a pioneer invention, the court made the following extensively cited statement:

[o]ne must start with the claim and, though a "non-pioneer" invention may be entitled to some range of equivalents, a court may not, under the guise of applying the doctrine of equivalents, erase a plethora of meaningful structural and functional limitations of the claim on which the public is entitled to rely in avoiding infringement. [n.34]

The court also stated:

[t]hough the doctrine of equivalents is designed to do equity, and to relieve the inventor from a semantic strait jacket when equity requires, it is not designed to permit wholesale redrafting of a claim to cover non- equivalent devices, i.e., to permit a claim expansion that would encompass more than an insubstantial change. [n.35] [footnotes omitted] [emphasis added]

The court then considered the issue of consideration of the invention as a whole. Citing *Hughes Aircraft v. United States*, supra, the court made clear that consideration of the invention as a whole relates to the claimed invention.

This court noted that it was legal error not to "apply the doctrine of equivalents to the claimed invention as a whole." [n.36]

Judge Markey further defines the quoted statement from the Hughes case with the following statement.

That statement dealt with an infringement inquiry implicating an entire claim, as distinguished from a section 112, paragraph 6 inquiry implicating only a "means plus function" limitation of a claim. That statement was also a recognition that, in applying the doctrine of equivalents, each limitation *265 must be viewed in the context of the entire claim. This statement should not be interpreted as sanctioning the treatment of claim limitations as insignificant or immaterial in determining infringement. [n.37]

Hence, Judge Markey makes clear that each element of the claim must be viewed in the context of the entire claim and that each claim limitation is significant and material. To establish the importance of each element of the claim, Judge Markey quotes from Lemelson.

It is... well settled that each element of a claim is material and essential, and that in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device. *Lemelson v. United States*, 752 F.2d 1538, 1551, 224 U.S.P.Q. 524, 533 (Fed. Cir. 1985). [n.38]

With regard to Judge Markey's statements in Perkin-Elmer pertaining to implicating an entire claim, as distinguished from a section 112, paragraph 6 inquiry, implicating only a means plus function limitation, the Hughes issue related to relocating a function to the satellite that was allowed by the post-Williams advancements in technology. Although the function of transmitting locational information to an external location was omitted by the S/E satellite, an equivalent function was performed by the on-board computer of the S/E satellite, which necessitated consideration of infringement under the doctrine of equivalents. The manner in which the omission of the function by the S/E satellite in the Hughes case implicated an entire claim, in Hughes, rather than a section 112, paragraph 6 inquiry, and did not in the Perkin-Elmer Corp. v. Westinghouse case, is unclear, since the claims in both Perkin-Elmer and in Hughes were recited in means plus function form. One explanation of this dilemma may be that the impedance matching and frequency tuning limitations in the Perkins-Elmer case were considered to be the heart of the Perkin-Elmer invention, whereas the limitation of transmitting locational information to an external source in Hughes was merely another limitation of the Hughes claim that did not go to the heart of the invention. In that regard, footnote 8 of the Perkin-Elmer decision [n.39] indicates Judge Markey's predisposition to that issue.

In determining priority of invention, consideration of the "gist" or "essence" of the invention may be appropriate. [citations omitted] We are aware of dicta that state consideration of the "essence," "gist," or "heart," of the invention may be helpful in determining infringement under the doctrine of equivalents. *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 228 U.S.P.Q. 90 (Fed. Cir. 1985); *Atlas Powder Company v. EI DuPont De Nemours & Co.*, 750 F.2d 1569, 1582, 224 U.S.P.Q. 409, 418, (Fed. Cir. 1984) (both citing **266Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 1567, 220 U.S.P.Q. 97, 101 (Fed. Cir. 1983)). That dicta may not be read as implying that specific claim limitations can be ignored as insignificant or immaterial in determining infringement. It must be read as shorthand for the considerations set forth in *Graver Tank*, i.e., that the infringer should not appropriate the invention by making substitutions for those limitations, when the substitutions do not substantially change the function performed or the way it is performed by the invention.

In footnote 8, Judge Markey may be implying that all limitations are important and necessary in determining infringement, but that some limitations, such as those that relate to the essence of the invention, are more important than others. Stated differently, perhaps the court is indicating that more important limitations, i.e., limitations that go to the heart of the invention, are given a narrower range of equivalency. Using this concept, one can easily distinguish between the holdings in Perkin-Elmer and Hughes. Additionally, the statements by Judge Markey regarding implicating an entire claim, also become clear. For example, in Hughes, the claim limitation that was missing in the S/E satellite was not at the heart of the invention and therefore had to be considered in the context of the entire claim. In Perkin-Elmer, however, the limitations of impedance matching and frequency tuning, did relate to the heart of the Perkin-Elmer invention and necessarily required closer correspondence of structure in the accused infringing Westinghouse device.

This concept also squares with the Pennwalt case wherein the "position indicating" means element was considered by the CAFC to be "crucial to patentability." [n.40] In fact, the court in Pennwalt cites the Perkin-Elmer v. Westinghouse case in reliance for its statements regarding infringement.

The concept that different limitations of a claim may have different ranges of equivalency due to the importance of these limitations in defining the "essence" of the invention, raises many interesting issues. For example, take the situation where claim 1 is an independent claim, and claims 2 through 10 are all dependent claims that each rely upon the previous claim, and each successive claim adds an additional element. Suppose further that the examiner rejects claims 1 through 9 and indicates that claim 10 would be allowable if placed in independent form, and the applicant cancels claims 1 through 9 and places claim 10 in independent form to include all the limitations.

From the perspective of an engineer who desires to design around the patented invention, recognizing that to do so is encouraged by public policy, should the engineer (at the advice of able counsel) consider the *267 element of the claim that was included in original claim 10 to be crucial to patentability and therefore a limitation of the claim that has a narrower range of equivalency? Furthermore, does the acquiescence of the applicant with regard to claim 10 constitute an admission by the applicant that the element is crucial to patentability of the invention under the doctrine of file wrapper estoppel? Further, assuming that some elements may have a different range of equivalency because of the importance of the elements to patentability, does this concept differ in scope from the doctrine of file wrapper estoppel in determining a range of equivalency of an element of the claim? It is not the intent of this paper to examine issues of file wrapper estoppel, but it is interesting to note that although the position indicating means in the Pennwalt case was included, as the court states, "so that it did not read on the prior art," [n.41] no mention was ever made of the doctrine of file wrapper estoppel to limit the application of the doctrine of equivalents with regard to the position indicating element. One can presume then that since the court considered the position indicating means to be an element that was crucial to patentability, that it had a narrower range of equivalency in the court's eyes.

In practice, there may be a general understanding among the members of the patent bar that infringement under the doctrine of equivalents is more likely to be found if an incidental and unimportant element of a claim is modified, rather than an element that goes to the heart of the invention, such as the "impedance matching" and "frequency tuning" functions of the Perkin- Elmer invention. This concept provides a convenient way of distinguishing the decisions of the CAFC, and constitutes a common sense way of applying the doctrine of equivalence in every day practice by patent attorneys and the courts.

LEMELSON v. UNITED STATES [n.42]

The Lemelson case involved several patents of Lemelson that related to a device for measuring the distance between two surfaces of machinery. Judges Markey, Baldwin and Miller, in an opinion by Judge Baldwin, held that Lemelson failed to meet his burden of proof by a preponderance of evidence to show that equivalent structures existed in the accused infringing device under the doctrine of equivalents, citing the Hughes Aircraft decision.

*268 The court also made the following statement

It is also well settled that each element of a claim is material and essential, in that, in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device. *Interdent Corp. v. United States*, 531 F.2d 547, 552, 187 U.S.P.Q. 226-27 (CT. CL. 1976); *Autogiro Company of America v. United States*, 384 F.2d 391, 403, 155 U.S.P.Q. 697, 707 (Ct. Cl. 1967). [n.43]

The CAFC understood the Court of Claims as finding "neither a manipulation means nor its substantial equivalent in the accused devices." [n.44] The CAFC further stated that Lemelson failed to point to any evidence showing a substantial equivalent for the "manipulation means" in the accused devices.

The combination of elements in the Lemelson claims, including the manipulation means, all appear to be important and necessary items for carrying out the invention. Despite this fact, however, the Lemelson case clearly turned on the failure of Lemelson to meet his burden of proof in showing, by a preponderance of the evidence, that the accused infringing device included the manipulation means or equivalents thereof, as required in the '042 patent claims. As made clear by the court, Lemelson's expert witness did not state, or even suggest, that the accused devices possess a substantial equivalent for the manipulation means.

Hence, the Lemelson case stands for the proposition that the patentee must meet its burden of proof, by a preponderance of evidence, by showing a corresponding structure, or equivalent structure, for each element of the claim in the accused infringing device. From the broad statements of the court, it appears that this burden exists for every element of the claim, no matter how trivial.

MARTIN v. BARBER [n.45]

The Martin v. Barber case was an appeal from a summary judgement entered by the District Court in Nevada. The case related to an invention by Martin relating to an ankle holding device for holding a person in an inverted position to alleviate back problems. The accused infringing device (the BackSwing) made by Barber, utilized a boom having cupped portions and a bar that is attachable to the boom to secure the user's ankles in the cupped portions. The Martin patent required "hook *269 means" and a "hinged member." The CAFC determined that the lower court incorrectly compared the Barber device with the preferred embodiment of the patentee's claimed invention. The court also stated:

[t]o determine whether the Back Swing and the claimed invention are equivalent, the fact finder must decide whether the components of the ankle holding portion of the Back Swing, viewed as a whole, operate in substantially the same way and have substantially the same function and result as the claimed invention. [n.46] [emphasis added]

These statements by the court were not necessary in remanding the case to the District Court and for that reason probably constitute dicta. In any event, these statements clearly differ from the statements in the Hughes case which relate to application of the doctrine of equivalents to the "claimed invention as a whole," [n.47] as opposed to viewing the accused infringing device (the BackSwing), as a whole. In that regard, the dissents in Pennwalt [n.48] and Perkin-Elmer [n.49] that rely upon Martin v. Barber, appear to be misplaced.

LOCTITE CORP. v. ULTRASEAL LTD. [n.50]

The Loctite case pertains to a claim of infringement by Loctite Corporation against UltraSeal regarding two patents relating to an "anaerobic curing sealant." The case turns on the definition of "anaerobic" which was limited by Loctite during the prosecution history by file wrapper estoppel. The term "anaerobic" had been included only in the preamble of the claim, but was considered by the court to be a "necessary limitation" [n.51] since the term "breathes life and meaning into the claim." [n.52] The CAFC considered the issue of infringement under the doctrine of equivalents by considering the Loctite claims as limited by the doctrine of file wrapper estoppel. The term "anaerobic" was narrowly construed by the court to include "rapid curing without oxygen."

CARMEN INDUSTRIES v. WAHL ET AL [n.53]

The Carmen Industries case involved an appeal from a finding of validity and infringement of the District Court of a patent by Eugene *270 A. Wahl by Carmen Industries relating to a device for promoting the flow of "difficult to handle solids" such as "wet sand, clay, or wood chips" from a storage hopper or bin. The Wahl device utilized a vibrating mechanism that caused the material to fall onto a material receiving member that was formed with a series of concave surfaces that were shaped to transport the material horizontally away from the bin. The claims recited a "compound concave surface" that imparted the horizontal motion to the materials in response to the vibration.

The infringing device used "compound straight slope (conical) walls" to accomplish the same result. The CAFC, in a decision by Jude Smith, "found that the precise slope of the walls is not critical to the invention." [n.54] The court also found that broadening of the claim language, under the doctrine of equivalents, did not render the claims invalid in view of the prior art., i.e., "none of the references was found to disclose compound broken/sloped walls." [n.55]

The interesting aspect of the Carmen Industries decision is that the court compared the shape of the walls of the "material receiving member" of the Carmen accused infringing device directly with the claim limitations in the Wahl patent in determining that the same result was obtained in the invention and the accused device, and that the flow of the materials in both devices resulted from "the same combination of forces." Hence, the court appeared to apply the (function, way, result) tripartite test to compare the material receiving member element of the Wahl claim to the Carmen accused infringing device. In this manner, an element-for-element comparison was made in the Carmen Industries case, despite reliance in Pennwalt and Perkin-Elmer dissents to the contrary. However, consideration was given to the "principal function" of the invention and the principal function of the accused infringing device. For example, the court made the following statement.

The claims were, however, held to be infringed under the doctrine of equivalents. The court first examined the invention and the alleged infringing device to ascertain the circumstances were proper for application of the doctrine of equivalents -- whether the accused device "performed substantially the same function in substantially the same way to obtain the same result." These circumstances are met when the alleged infringer seeks to appropriate the invention with minor modifications to avoid the literal language of the claim. [footnote omitted]

The principal function of the invention is to promote the flow of material from the hopper. The accused infringing device also performs that function. [n.56] [emphasis added]

*271 Judge Bennett's dissent in Pennwalt and Judge Newman's dissent in Perkin-Elmer Corp. v. Westinghouse rely upon Carmen Industries as standing for the proposition in that the invention must be considered as a whole in determining infringement under the doctrine of equivalents. Judge Smith makes broad statements in Carmen Industries regarding the fact that the principal function of the invention is the same as the accused device. The Carmen Industries case, however, was actually decided by a comparison of the "material receiving member" element of the Wahl claim with the corresponding structure in the accused Carmen device. In reality, the tripartite (function/way/result) test was used, sub silentio, by the court, when it compared each of the claimed elements with the accused infringing structure to find equivalents in the Carmen Industries decision.

ACS HOSPITAL SYSTEMS, INC. v. MONTEFIORE HOSPITAL [n.57]

In the Pennwalt case, Judge Nies cited ACS Hospital Systems as precedent for the concept that each element of a claim must be considered under the All Elements Rule. The ACS Hospital Systems case involved a claim of infringement regarding a control system for hospital or motel pay TVs which included a "key operated actuating switch," a "remote control actuating switch" and "an indicator light." The accused infringing device (Wells device) had all three of these physical elements but did not function to allow the remote switch to override the locked switch, as required by the claims.

The CAFC concluded that the District Court's finding that the Wells accused infringing device did not literally infringe the claims, was not clearly erroneous, in that the "overriding feature" was not performed by the Wells device.

With regard to infringement under the doctrine of equivalents, the CAFC stated that the District Court did not enter any findings on the issue of equivalents and inferred ... that the district court necessarily found that the Wells device, lacking the claimed function of overriding a locked key switch, does not function in substantially the same way as the claimed invention. [n.58]

The ACS Hospital Systems case does support the doctrine of the All Elements Rule, but additionally requires the accused device to perform exactly in the manner of the recited function of the claim in order to *272 find literal infringement which is in accord with the holding in Pennwalt.

THOMAS & BETTS CORP. v. LITTON SYSTEMS, INC. [n.59]

This case involved an appeal from the district court decision of noninfringement of the Thomas & Betts patent relating to an electrical connector. Thomas & Betts sued Litton Systems, Inc., for the manufacture and sale of a "single strut" electrical connector.

The CAFC found that the Thomas & Betts patent was not a pioneer invention, but rather, was issued in the crowded art of electrical connectors and should be given a narrow range of equivalents. The CAFC held that the District Court committed clear error when it considered that the test for equivalency, under the doctrine of equivalents, extends only to structure that is literally disclosed in the patent specification. The CAFC also determined that the technique of "off-setting of paired apertures" could achieve the desired "pitch," and that such techniques would have been within the knowledge of one of ordinary skill in the art. Consequently, the CAFC determined that there was equivalency under the doctrine of equivalents. The court also found that by construing the claim in this manner, under the doctrine of equivalents, the patented subject matter would not have been obvious to one of ordinary skill in the art at the time the invention was made, and therefore, the patent was valid.

HI-LIFE PRODUCTS, INC. v. AMERICAN NATIONAL WATER-MATTRESS CORP. [n.60]

The Hi-Life case pertained to a patent for a waterbed mattress that utilized a wave dampening system that consisted of a foam material that was sufficiently light to float on the top portion of a waterbed mattress container to dampen waves. Open cell foam material, that has a low specific gravity, was disposed throughout the foam slab to enable the foam slab to achieve its lightweight and enable it to float on the upper surface of the waterbed container. During the prosecution of the application, the examiner cited prior art references from the non-waterbed art showing the use of open cell foam disposed

throughout a foam slab structure. The accused infringing device utilized a sheet of low specific gravity material attached to the bottom surface of the foam to cause the foam slab to float near the top of the waterbed container.

*273 The court held that there was no literal infringement of the patent.

Literal infringement requires that the accused waterbed mattresses embody every limitation of the asserted claims. *Builders Concrete, Inc. v. Bremerton Concrete Prods. Co.*, 757 F.2d 255, 257, 225 U.S.P.Q. 240, 241 (Fed. Cir. 1985).

The court stated that because the "disposed throughout" limitation of the claims was not met, there was no literal infringement.

The CAFC also overturned the lower court decision and determined that Hi-Life was not precluded from asserting infringement under the doctrine of equivalents because the claims had been amended to include the "disposed throughout" limitation during the prosecution of the application at the suggestion of the examiner.

Here, the patentee did not amend the claims to avoid cited prior art, but rather to better define a patentable invention. The limitation of disposing a lightweight material throughout an open cell foam was old in the nonwaterbed art and did not in itself render the claims patentable. Accordingly, prosecution history estoppel was not created by the mere presence of the "disposed throughout" limitation in the claims. We have reviewed the other prior art of record and can find no reference that would support the District Court's holding. Therefore, the amended claims are entitled to some range of equivalence. [n.61]

Hence, the CAFC remanded the case to the District Court for further consideration based on the fact that the nonrelevancy of the art afforded the "disposed throughout" limitation of the claim some range of equivalency.

This case indicates the willingness of the CAFC to consider different ranges of equivalency for various elements of a claim depending upon the particular circumstances surrounding the claimed element. In this instance, the hard and fast rule of file wrapper estoppel was not applied where the amendment to the claims was made in response to nonrelevant art. This appears to be a corollary application of the concept that different claim limitations have different ranges of equivalency depending upon the importance of the limitation to patentability.

III. Conclusion

A. Literal Infringement

The CAFC has uniformly upheld the concept that an accused infringing device must fall within the literal meaning of the claim to find literal infringement. With regard to means plus function type claims, the function must be performed "exactly" by the accused

infringing device. Also, "equivalents thereof," under 35USC112, paragraph 6, only pertain to structure that is actually disclosed in the specification and does not *274 relate, in any way, to equivalency under the doctrine of equivalents. These holdings by the CAFC have provided a bright line rule for determining literal infringement that gives potential infringers fair notice of the standards that are to be used by the courts.

B. Doctrine of Equivalents

The decisions in *Pennwalt*, *Perkin-Elmer* and *Lemelson*, as well as many other cases, have made clear that "an element-by-element comparison" of the elements of the claim with the structural elements of an accused infringing device must be made, and equivalent structure must be found corresponding to every element of the claim in order to find infringement under the doctrine of equivalents. The decisions in *Hughes*, *Martin v. Barber*, and *Carmen Industries*, however, have included broad statements regarding consideration of the invention, or the accused infringing device, "as a whole." These cases can be reconciled by attaching a significance or importance to the element of the claim under consideration, which may result from the fact that the element goes to the "heart" or "essence" of the invention, that it was "crucial to patentability" or, alternatively, it was added to the application under the doctrine of file wrapper estoppel. Such important limitations of the claim presumably have a narrower range of equivalents. Application of the doctrine of equivalents, in this manner, is a common sense way of determining infringement in everyday practice by both patent attorneys and the courts, and provides a convenient way to balance the concepts of fair notice to potential infringers with equitable considerations that can arise from the "semantic strait jacket" of the language of the claims.

[n.a] Senior attorney, Hewlett-Packard, Loveland, Co., B.S.E.E. Colorado State University, 1969, J.D., George Washington University Law School 1974.

[n.1] Chisum "Patents" Section 18.02[1].

[n.2] Id.

[n.3] Id.

[n.4] *Graver Tank & Mfg. Co. v. Line Air Products. Co.*, 339 U.S. 605, 85 U.S.P.Q. 328 (1950).

[n.5] *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 3 U.S.P.Q. 40, (1929) and *Machine Co. v. Murphy*, 97 U.S. 120.

[n.6] Other recent articles that discuss similar issues are "Three Ambiguities of the Doctrine of Equivalents in the Federal Circuit" by Robert W. Harris, *JPTOS*, Vol 69, No. 2, pp. 91-110; "The Federal Circuit Resolves Ambiguities in the Doctrine of Equivalents" by William H. Nieman, *JPTOS*, Vol. 70, No. 3, pp. 153-161 (also printed in *NEWMATTER*, Vol 13, No. 1 spring 1988); and, *COURT of APPEALS FOR THE FEDERAL CIRCUIT NEWSLETTER*, American Bar Association, Section on Litigation, Vol. III, No. 8, Sept. 87-Nov. 87, pp. 267-279.

[n.7] *Pennwalt Corp. v. Durand-Wayland, Inc.* _____ F.2d _____, 4 U.S.P.Q. 1737, 1740.

[n.8] *Id.*

[n.9] 4 U.S.P.Q. 2d at 1767 citing *Graver Tank*, *supra*.

[n.10] 4 U.S.P.Q. 2d at 1738.

[n.11] *Id.*

[n.12] 4 U.S.P.Q. 2d at 1757.

[n.13] 4 U.S.P.Q. 2d at 1739.

[n.14] *Id.*

[n.15] *Id.*

[n.16] *Id.* (see footnote 1 of *Pennwalt*)

[n.17] 4 U.S.P.Q. 2d at 1741.

[n.18] Id.

[n.19] 4 U.S.P.Q. 2d at 1742.

[n.20] 4 U.S.P.Q. 2d at 1742 and 1743.

[n.21] 4 U.S.P.Q. 2d at 1740.

[n.22] Id.

[n.23] 4 U.S.P.Q. 2d at 1755.

[n.24] 4 U.S.P.Q. 2d at 1752.

[n.25] *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 219 U.S.P.Q. 473 (Fed. Cir. 1983).

[n.26] 775 F.2d 1564, 225 U.S.P.Q. 233 (Fed. Cir. 1985).

[n.27] 724 F.2d 932, 220 U.S.P.Q. 481 (Fed. Cir. 1983).

[n.28] 4 U.S.P.Q. at 483.

[n.29] 4 U.S.P.Q. at 484.

[n.30] 219 U.S.P.Q. at 482.

[n.31] 822 F.2d 1528, 3 U.S.P.Q. 2d 1321 (Fed. Cir. 1987).

[n.32] 3 U.S.P.Q. 2d at 1324.

[n.33] 3 U.S.P.Q. 2d at 1324.

[n.34] Id.

[n.35] Id.

[n.36] Id.

[n.37] 3 U.S.P.Q. 2d 1324-25.

[n.38] 3 U.S.P.Q. 2d at 1325.

[n.39] Id.

[n.40] 4 U.S.P.Q. 2d at 1741.

[n.41] Id. citing the lower court decision, Pennwalt, 225 U.S.P.Q. at 570.

[n.42] 752 F.2d 1538, 224 U.S.P.Q. 526 (Fed. Cir. 1985).

[n.43] 224 U.S.P.Q. at 533.

[n.44] Id.

[n.45] 755 F.2d 1564, 225 U.S.P.Q. 233 (Fed. Cir. 1985).

[n.46] 225 U.S.P.Q. at 235.

[n.47] 219 U.S.P.Q. at 482.

[n.48] 4 U.S.P.Q. 2d at 1744.

[n.49] 3 U.S.P.Q. 2d at 1329.

[n.50] 781 F.2d 861, 228 U.S.P.Q. 90 (Fed. Cir. 1985).

[n.51] 228 U.S.P.Q. at 92.

[n.52] Id.

[n.53] 724 F.2d 932, 220 U.S.P.Q. 481 (Fed. Cir. 1983).

[n.54] 220 U.S.P.Q. at 489.

[n.55] Id.

[n.56] 220 U.S.P.Q. at 488-89.

[n.57] 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984).

[n.58] 221 U.S.P.Q. at 936.

[n.59] 720 F.2d 1572. 220 U.S.P.Q. 1 (Fed. Cir. 1983).

[n.60] _____ F.2d _____, 6 U.S.P.Q. 2d 1132 (Fed. Cir. 1988).

[n.61] 6 U.S.P.Q. at 1134.