

SIGNTECH USA LTD. V. VUTEK INC.

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Patent drafters frequently use structural terms to specifically identify a claimed invention. Sometimes, however, structural terms are unnecessarily cumbersome or inadequate to describe an element of a claim. In 1952, Congress addressed this problem by allowing a claim to be written in terms of what it does rather than in terms of its structure. In particular, Congress provided in 35 U.S.C. § 112 ¶ 6 that a claim element could be expressed as a “means or step for performing a specified function.”¹ While this statutory provision eliminates the need to recite structure in the limitation itself, the applicant must describe in the patent specification some structure which performs the specified function.² This structure, and its equivalents, determine the scope of the so-called “means-plus-function” claim element.³

Although means-plus-function claims can be useful, the Federal Circuit’s decision in *Signtech USA Ltd. v. Vutek Inc.*⁴ (“*Signtech*”) illustrates that patent drafters must be cautious when invoking section 112, paragraph 6. In *Signtech*, the Federal Circuit construed the means-plus-function claim at issue to cover nothing more than the invention’s preferred embodiment. There were two reasons for the Federal Circuit’s narrow construction. First, *Signtech* used unnecessary, limiting language throughout the specification of the patent at issue. Second, the Federal Circuit requires “structural equivalence” as a prerequisite for infringement under section 112, paragraph 6. This Note will examine both reasons for *Signtech*’s failure, explain how *Signtech* could have broadened the scope of its means-plus-function claims, and discuss how the Federal Circuit’s judicially created “structural equivalence” requirement has the effect of eliminating the phrase “and equivalents thereof” from the statutory language.

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1. See 35 U.S.C. § 112 ¶ 6 (1994) (“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.”).

2. See *id.*

3. See, e.g., *Valmont Indust., Inc. v. Reinke Mfg Co., Inc.*, 983 F.2d 1039, 1041-42 (Fed. Cir. 1993) (explaining the history and limiting effect of 35 U.S.C. § 112 ¶ 6).

4. 174 F.3d 1352 (Fed. Cir. 1999).

I. BACKGROUND

Signtech owns U.S. Patent No. 5,376,957 (“the ’957 patent”), which discloses an ink sprayhead design for inkjet printers.⁵ The novel feature of the improved sprayhead is that it enables dual-sided, mirror image printing of large images without ink accumulating in the nozzle.⁶ Claim 1 of the ’957 patent, which was the claim at issue in the case, includes several limitations that relate to an “ink delivery means.” Specifically, claim 1 of the ’957 patent provides:

An apparatus for reproducing an image on a first side of a substrate and a mirror image on a second side of said substrate, comprising:

a frame;

means for generating control signals representative of said image;

ink delivery means positioned on opposite sides of said substrate, said *ink delivery means* fluidly communicating with an ink source;

means mounted on said frame for supporting said *ink delivery means*;

means mounted on said frame for driving said *ink delivery means* relative to said substrate; and

means, responsive to said control signals, for controlling said *ink delivery means* to produce said image on said first side of said substrate and said mirror image on said second side of said substrate.⁷

The fact that the “ink delivery means” limitation contains the word “means” strongly suggests that section 112, paragraph 6 applies, and that the limitation should be construed as a means-plus-function claim.⁸ Means-plus-function claim elements are construed to cover the corresponding structure described in the specification and equivalents thereof.⁹ There are two descriptions of “ink delivery means” in the ’957 patent specification.¹⁰ The first design utilizes two high pressure air sources: one

5. *See id.* at 1354.

6. *See id.*

7. *Id.* at 1354-55 (emphasis added).

8. *See* discussion, *infra* note 28.

9. *See, e.g.,* Kahn v. General Motors Corp., 135 F.3d 1472, 1476 (Fed. Cir. 1998) (“Claims written in means-plus-function form are interpreted to cover the structure set forth in the specification and its equivalents.”).

10. *See* U.S. Patent No. 5,376,957, at col. 3, ll. 29-48; col. 10, ll. 30-47 (issued December 27, 1994).

to apply ink, and another to continuously clean the ink nozzle during printing.¹¹ This design—specifically, the use of the two air sources—is referred to repeatedly in the background and summary of the invention sections of the '957 patent as distinguishing the invention from prior art.¹² The second design described in the specification utilizes just one pressurized air source with a pulse-width modulated air flow.¹³

Vutek owns U.S. Patent No. 4,914,522 (“the '522 patent”), which is prior art to Signtech’s '957 patent.¹⁴ Signtech’s '957 patent explicitly distinguishes Vutek’s '522 patent, stating that the ink sprayhead design disclosed in the '522 patent has only one air source.¹⁵ Vutek’s ink jet printers contain a structure identical to the one disclosed in the '522 patent.¹⁶

Signtech sued Vutek for infringement of the '957 patent.¹⁷ Vutek counterclaimed for infringement of its '522 patent.¹⁸ Signtech stipulated to infringement of Vutek’s '522 patent if valid.¹⁹

II. PROCEDURAL HISTORY

A. District Court Decision

By consent, the parties tried their claims before a United States magistrate judge in the United States District Court for the Western District of Texas.²⁰ There was no dispute between the parties that the “ink delivery means” limitation in claim 1 of the '957 patent is a “means-plus-function” claim element. Because of the repeated reference to the dual air source in the '957 specification, the magistrate construed the “ink delivery means” limitation as an ink sprayhead containing two pressurized air sources.²¹ The magistrate therefore held that Vutek’s printers, which contain only one air source, do not infringe Signtech’s '957 patent.²² In addition, the magistrate found Vutek’s '522 patent valid and Signtech’s infringement of

11. See *Signtech USA Ltd. v. Vutek Inc.*, 174 F.3d 1352, 1357 (Fed. Cir. 1999).

12. See *id.* at 1356-57.

13. See *id.*

14. See *id.*

15. See *id.*

16. See *id.*

17. See *id.* at 1354.

18. See *id.*

19. See *id.* Signtech and Vutek stipulated to basic damages of \$140,000. See *id.*

20. See *id.*

21. See *id.* at 1355.

22. See *id.*

the '522 patent willful.²³ The magistrate also entered an injunction prohibiting Signtech from "any further infringement of the '522 patent."²⁴

B. Federal Circuit Decision

Signtech appealed the finding of noninfringement of the '957 patent, the vagueness of the injunction, and the amount of damages awarded to Vutek for Signtech's infringement of its '522 patent.²⁵ The Federal Circuit affirmed the magistrate's findings with respect to the '957 patent and upheld the magistrate's injunction.²⁶

1. Noninfringement of the '957 patent

The Federal Circuit affirmed the district court's construction of the "ink delivery means" recited in claim 1 of the '957 patent.²⁷ According to the Federal Circuit, a means-plus-function claim element is typically presumed when the term "means" appears with a function in a claim limitation.²⁸ "Ink delivery" is a function; therefore, the district court properly identified the "ink delivery means" limitation in the '957 patent as a means-plus-function claim element. Because the "ink delivery means" limitation is a means-plus-function claim element, the district court properly consulted the specification of the '957 patent in construing that limi-

23. *See id.* Because the infringement was found to be willful, the magistrate trebled the basic damages of \$140,000. The magistrate, however, added the \$420,000 enhanced damages to the stipulated \$140,000 basic damages award. *See id.*

24. *Id.* at 1356.

25. *See id.* at 1354.

26. *See id.* The Federal Circuit reversed a portion of the district court's decision with respect to damages, clarifying that the \$140,000 damage award should have been included within the \$420,000 enhanced damage award. *See id.* at 1359.

27. *See id.* at 1356.

28. It is unclear whether use of the word "means" invokes a presumption that section 112, paragraph 6 applies. The Federal Circuit first alluded to such a presumption in *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1584 (Fed. Cir. 1996) ("[I]t is fair to say that the use of the term 'means' (particularly as used in the phrase 'means for') generally invokes section 112(6) and that the use of a different formulation generally does not."). In *York Products, Inc. v. Central Tractor Farm & Family Center*, 99 F.3d 1568 (Fed. Cir. 1996), the Federal Circuit stated that "the use of the word 'means' triggers a presumption that the inventor used this term advisedly to invoke the statutory mandates for means-plus-function clauses." *Id.* at 1573. However, in *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524 (Fed. Cir. 1996), the majority stated that use of the word "means" with a named element "does not automatically make the element a 'means-plus-function' element" and denied the existence of a "presumption to the contrary." *Id.* at 531. Judge Rader, in dissent, argued that the majority had either ignored or misapplied the presumption. He argued that "[s]ome claim language describing the location of the structure should not be sufficient to overcome [the] presumption [that section 112, paragraph 6 should apply]." *Id.* at 533 (Rader, J., dissenting).

tation.²⁹ Throughout the specification—in the background and summary of invention sections, and in describing the preferred embodiment—Signtech repeatedly describes its invention as an ink sprayhead containing *two* pressurized air sources.³⁰ The specification also states, repeatedly, that the use of two air sources constitutes the invention's improvement over the prior art.³¹ Therefore, the Federal Circuit agreed with the district court's construction of "ink delivery means" as an ink sprayhead containing two pressurized air sources.³²

In upholding the district court's claim construction, the Federal Circuit dismissed two separate arguments from Signtech. First, Signtech argued that it was incorrect for the magistrate to construe the "ink delivery means" limitation as including two air sources, because a portion of the '957 patent specification described an "ink delivery means" with only one air source.³³ Second, Signtech argued that the district court's construction was unfair in light of the prosecution history of the '957 patent.³⁴

The Federal Circuit summarily dismissed the first argument, noting that there were significant differences between Signtech's alternative embodiment and Vutek's accused device. Specifically, the Federal Circuit pointed out that Signtech's alternative embodiment described a "single constant air flow and a pulse-width modulated ink flow" to control ink delivery.³⁵ In contrast, Vutek's device used "pulse-width modulated constant pressure air flow" to control ink delivery.³⁶ These differences, according to the Federal Circuit, were so striking that no reasonable jury could find Vutek's ink delivery means equivalent to that described in Signtech's alternative embodiment.³⁷ Accordingly, even if the "ink delivery means" limitation were construed to cover Signtech's alternative embodiment, it would still not cover Vutek's device.³⁸

Signtech's second argument, based on the '957 patent's prosecution history, was slightly more complicated. Signtech also owns U.S. Patent No. 5,294,946 ("the '946 patent"), which is the parent to the '957 patent.³⁹ Signtech included claim elements for the use of two pressurized air

29. *See* Signtech USA Ltd. v. Vutek Inc., 174 F.3d 1352,1356 (Fed. Cir. 1999).

30. *See id.* at 1357.

31. *See id.* at 1356-57.

32. *See id.* at 1357.

33. *See id.*

34. *See id.* at 1357-58.

35. *See id.* at 1357.

36. *See id.*

37. *See id.*

38. *See id.*

39. *See id.*

sources in the application that eventually issued as the '946 patent ("the '946 patent application").⁴⁰ During prosecution of the '946 patent application, the Examiner directed Signtech to choose between prosecuting "[a] two side ink jet printer with two pressure flows" and "[a] two side ink jet printer."⁴¹ The former claim element was selected for the '946 patent application.⁴² Signtech filed a continuation application with the latter claim element; this application eventually issued as the '957 patent.⁴³ Signtech argued that it was unfair to give the '957 patent a meaning no broader than its parent, even though the Examiner required separation into different applications.⁴⁴ The Federal Circuit acknowledged that a patent's prosecution history is relevant to the construction of a claim written in means-plus-function form.⁴⁵ However, the Federal Circuit rejected Signtech's argument in the present case, holding that the specification of the '957 patent limits the scope of the claim at issue, regardless of the patent's prosecution history.⁴⁶

After upholding the district court's construction of Signtech's "ink delivery means" limitation, the Federal Circuit also affirmed the district court's finding that Vutek's accused device did not infringe the '957 patent.⁴⁷ For a means-plus-function limitation to read on an accused device, the accused device must perform an identical function through equivalent means.⁴⁸ Because Signtech had stated that Vutek's device was incapable of achieving the desired results of the invention, the "ink delivery means" employed by Vutek's device were not equivalent to the "ink delivery means" covered by Signtech's patent.⁴⁹

40. *See id.* at 1358.

41. *See id.* at 1357-58.

42. *See id.* at 1358.

43. *See id.*

44. *See id.*

45. *See id.*

46. *See id.*

47. *See id.*

48. *See, e.g.,* *Micro Chemical, Inc. v. Great Plains Chemical Co., Inc.*, 103 F.3d 1538, 1547 (Fed. Cir. 1997) ("Literal infringement of a claim containing a means clause requires that the accused device perform the identical function as that identified in the means clause and do so with structure which is the same as or equivalent to that disclosed in the specification.").

49. *See* *Signtech USA Ltd. v. Vutek Inc.*, 174 F.3d 1352, 1357 (Fed. Cir. 1999). The parties did not present evidence concerning infringement under the doctrine of equivalents. *See id.* at 1358.

2. Injunction

Signtech argued that the magistrate's order was too broad, encompassing not only those products which had been shown to infringe Vutek's '522 patent (and trivial variations thereof), but also including any product which could even theoretically infringe Vutek's '522 patent.⁵⁰ The Federal Circuit disagreed and upheld the injunction, finding it unlikely that unwarranted contempt actions would be brought against Signtech in light of "the detailed record on which this injunction was entered."⁵¹

III. DISCUSSION

A. Avoiding Limitation to the Preferred Embodiment

In *Serrano v. Telular Corp.*,⁵² the Federal Circuit held that patentees are not necessarily limited to their preferred embodiment.⁵³ Because the Federal Circuit limited Signtech's means-plus-function claim to the structure of its preferred embodiment, it appeared to ignore *Serrano* in deciding the present case. However, as will be discussed below, Signtech was properly limited to its preferred embodiment because of limiting language in the '957 patent specification. Accordingly, *Signtech* underscores the importance of carefully drafting the patent specification when using means-plus-function claims.

In *Serrano*, like the present case, the main issue was interpretation of a means-plus-function claim.⁵⁴ The patents at issue in *Serrano* concerned a method and apparatus for interfacing a communications device (e.g., a telephone) with a radio transceiver (e.g., a cellular telephone).⁵⁵ Telular's patent claimed means for determining the last digit dialed on the communications device ("determining means").⁵⁶ The "determining means" disclosed in Telular's preferred embodiment used a "digit analysis" approach, implemented in discrete logic.⁵⁷ The structure disclosed in the preferred embodiment would not cover Telular's accused device, which used a "time-out" approach, implemented with a microprocessor-based system.⁵⁸

50. *See id.* at 1359.

51. *See id.*

52. 111 F.3d 1578 (Fed. Cir. 1997).

53. *See id.* at 1583 (holding that alternative embodiment stated in disclosure is within scope of claim).

54. *See id.* at 1582.

55. *See id.* at 1580.

56. *See id.*

57. *See id.* at 1580-81.

58. *See id.* at 1583.

However, Telular pointed to a portion of the specification which disclosed an alternative embodiment that used a “time-out” approach.⁵⁹ The specification also stated that one skilled in the art should recognize that a micro-processor-based system could be used in place of discrete logic.⁶⁰ The Federal Circuit agreed with Telular and upheld the district court’s ruling, on summary judgment, that Serrano’s accused device infringed Telular’s patent.⁶¹ The Federal Circuit held that a means clause must be construed to cover the disclosed structure and equivalents thereof, and stated: “Disclosed structure includes that which is described in a patent specification, including any alternative structures identified.”⁶²

At first glance, *Signtech* seems to conflict with *Serrano*. In *Signtech*, the Federal Circuit affirmed the magistrate’s interpretation of Signtech’s “ink delivery means.”⁶³ The magistrate held that Signtech’s “ink delivery means cannot be interpreted apart from the essential, cleaning, high-pressure air source,” which was an integral part of its preferred embodiment.⁶⁴ But in the specification for the ’957 patent, Signtech also disclosed an alternative embodiment that did not contain the second, high-pressure air source.⁶⁵ Therefore, *Signtech* appears to stand for the proposition that patentees are restricted to their preferred embodiment, which would be in direct conflict with the *Serrano* holding.

Throughout the ’957 patent specification—in the abstract, background of the invention (“background”), and summary of the invention (“summary”) sections—Signtech describes the second air pressure source as being the most important feature of the invention. One novel feature of Signtech’s invention is the ability to produce a printed image, in color, with only one spray cycle.⁶⁶ This feature is desirable because subsequent spray cycles distort the color of previously printed pixels.⁶⁷ According to

59. *See id.* at 1582-83.

60. *See id.* at 1583.

61. *See id.*

62. *Id.*

63. *See Signtech USA Ltd. v. Vutek Inc.*, 174 F.3d 1352, 1356 (Fed. Cir. 1999).

64. *Id.* at 1355.

65. *See id.* at 1357.

66. *See* ’957 patent, *supra* note 10, at col. 3, ll. 26-28.

67. The specification of Signtech’s ’957 patent states:

Excess ink on the spray gun nozzles cause extra ink to be applied to the paper during subsequent spray cycles. The excess ink changes the color density of subsequent pixels. That is, the actual color of the pixels is incorrect from the desired color, thus changing the color of the entire image. The color changes are noticeable to the human eye and result in a reproduced image of poor quality.

’957 patent, *supra* note 10, at col. 1, ll. 52-59.

Signtech, previous ink jet printers were unable to accomplish this result because ink would accumulate and clog the sprayhead nozzles.⁶⁸ Throughout the specification of the '957 patent, Signtech attributes the novel feature of its invention to the presence of a second, high-pressure air source, which prevents ink jet clogging. For example, the abstract mentions only a sprayhead with two air sources:

[t]he present invention is further provided with *dual air sources* to apply the ink. A first source is pulse width modulated to control the amount of ink sprayed onto the substrate. A *second air pressure source is continuously applied to the ink jet spray nozzles to remove the excess ink* that accumulates about the nozzles during print operations.⁶⁹

Similarly, the background states that two air sources are used to overcome the ink accumulation problem.

[T]he ink jet printer system of the present invention implements a design which *overcomes the problem of ink accumulation* on the spray head nozzles. The present invention is provided with *dual pressure sources, a low volume high pressure constant air source to prevent the accumulation of excess ink on the nozzles,* and a high volume low pressure constant air source for drawing the ink from the nozzles for application to the imaging medium.⁷⁰

In addition, the background specifically states that ink sprayheads with only one constant air pressure source are incapable of preventing ink jet clogging.

The [invention disclosed in a prior patent] *does not solve the ink accumulation problem because it uses a single constant air pressure source.* The single constant air pressure source applies the ink onto the imaging medium with sufficient force to cause misting, but *is of insufficient force to prevent the ink from accumulating on the nozzles.*⁷¹

The summary also describes how the second air source constitutes the invention's improvement over the prior art.

68. *See id.* at col. 2, ll. 10-24.

69. *Id.* at abstract (emphasis added).

70. *Id.* at col. 2, ll. 56-64 (emphasis added).

71. *Id.* at col. 2, ll. 13-20 (emphasis added).

[T]he utilization of the second air source makes the present invention a significant improvement over conventional ink jet printer systems.⁷²

Finally, the summary section reemphasizes how crucial the second air source is to the invention.

[T]he present invention is capable of producing a sectioned image on the substrate in one continuous print because its sprayhead design prevents ink jet clogging. The sprayheads of the present invention are connected to two separate air pressure sources which operate to apply the ink and prevent the ink jets from becoming clogged.⁷³

The alternative embodiment with only one air source is mentioned only once in the '957 patent.⁷⁴ The sprayhead in the alternative embodiment is "coupled to a constant air pressure source . . . which provides a continuous supply of air across [the] ink jet . . .".⁷⁵ There is no mention of how—or even if—this single air source design solves the ink accumulation problem.

The way the means-plus-function limitation is described in Signtech's '957 patent is much different from the description in the patents at issue in *Serrano* ("the *Serrano* patents"). As stated above, *Serrano* involved the interpretation of a "determining means" limitation. Although the abstract and background sections of the *Serrano* patents identify the function performed by the means-plus-function claim element (i.e., determining the last digit dialed on the communications device), these sections do not de-

72. *Id.* at col. 3, ll. 46-48.

73. *Id.* at col. 3, ll. 26-32.

74. The alternative embodiment is described in the specification of the '957 patent as follows:

Ink sprayhead 70 differs from the ink sprayheads of the preferred embodiment because the ink flow is modulated to control the color density rather than the air supply. Ink sprayhead 70 comprises ink jet 71 coupled to a constant air pressure source (not shown) via passage 72 which provides a continuous supply of air across ink jet 71. Ink sprayhead 70 further comprises ink valve 73 disposed between ink jet 71 and the ink reservoirs described with reference to FIG. 4. At the beginning of a pixel print, ink valve 73 opens to allow the flow of ink to ink jet 71. The air stream delivered past ink jet 71 picks up the ink and applies it to the substrate. When the desired pixel density is reached, ink valve 73 closes, and the flow of ink from ink jet 71 ceases. Thus, the modulation of ink valve 73 controls the pixel print densities.

Id. at col. 10, ll. 32-47.

75. *Id.* at col. 10, ll. 35-38.

scribe how that function might be performed.⁷⁶ The alternative “time-out” approach is introduced and discussed in the same paragraph as the “digit analysis” approach used in the preferred embodiment.⁷⁷ And even though the *Serrano* patents disclose both the “digit analysis” and “time-out” features as being implemented in discrete logic circuitry, the specification explicitly states that a microprocessor-based system could also be used.⁷⁸

Analysis, therefore, reveals that *Signtech* and *Serrano* are consistent with one another. *Signtech* was limited to its preferred embodiment in the present case because the specification repeatedly emphasizes one implementation of the “ink delivery means” as being the novel feature of the invention. The *Serrano* patents do not suffer from this inadequacy.

Thus, one important lesson that *Signtech* teaches is the importance of carefully drafting the specification when using means-plus-function claims. Because the specification determines the scope of the means-plus-function claims,⁷⁹ patent drafters should avoid using any language that identifies one embodiment of the claimed means as encompassing the only important feature of the invention. In addition, patent drafters should disclose as many alternative embodiments as possible, being careful to fully explain how each alternative embodiment possesses the novel features of the invention.

B. Structural Equivalence

A means-plus-function limitation is construed to cover the structure disclosed in the specification “and equivalents thereof.”⁸⁰ The definition of “equivalents,” however, remains unclear. It could be argued in the present case that Vutek’s accused device contains an “ink delivery means” that is “equivalent” to that disclosed in *Signtech*’s alternative embodiment. Still, the Federal Circuit abruptly held, without explanation, that no reasonable jury could find Vutek’s accused device equivalent to *Signtech*’s alternative embodiment.⁸¹ This holding is consistent with recent Federal Circuit

76. See U.S. Patent No. 4,775,997 (issued Oct. 4, 1988); U.S. Patent No. 4,922,517 (issued May 1, 1990).

77. See '517 patent, *supra* note 76, at col. 10, ll. 15-29 (discussing digit analysis approach); col. 10, ll. 30-37 (discussing time-out approach).

78. See *Serrano v. Telular Corp.*, 111 F.3d 1578, 1583 (Fed. Cir. 1997).

79. See *Kahn v. General Motors Corp.*, 135 F.3d 1472, 1476 (Fed. Cir. 1998) (“Unlike the ordinary situation in which claims may not be limited by functions or elements disclosed in the specification, but not included in the claims themselves, in writing a claim in means-plus-function form, a party is limited to the corresponding structure disclosed in the specification and its equivalents.”).

80. See 35 U.S.C. § 112 ¶ 6 (1994).

81. See *Signtech USA Ltd. v. Vutek Inc.*, 174 F.3d 1352, 1357 (Fed. Cir. 1999).

decisions, which suggest that structural equivalence is necessary for finding equivalence under section 112, paragraph 6. The structural equivalence requirement, however, has the effect of eliminating the phrase "and equivalents thereof" from the language of section 112, paragraph 6.

1. *Structural equivalence in Signtech*

In *Signtech*, the Federal Circuit had little difficulty finding that Signtech's alternative embodiment was not equivalent to Vutek's accused device, in spite of similarities in the "ink delivery means" used by the two devices. Both Signtech's alternative embodiment and Vutek's accused device use a constant pressure air source to spray air over the ink jets, thereby causing ink to be applied onto a recording medium.⁸² Both devices interrupt the flow of ink after each pixel is printed.⁸³ The only difference between the two "ink delivery means" is that Signtech's device controls the supply of ink to the ink jets by modulation of the opening and closing of ink valves, whereas Vutek's device controls the supply of ink to the ink jets by modulation of the air source.⁸⁴ Still, the Federal Circuit held, with-

82. Vutek's accused device is identical to the embodiment disclosed in its '522 patent. The abstract of the Vutek '522 patent states: "A flow of constant-pressure air is pulse-width modulated in accordance with the control signals and passed over an ink meniscus maintained on the end of a small nozzle. *The pulse-modulated air* flowing across the meniscus causes the ink to be sprayed onto the recording medium." U.S. Patent No. 4,914,522, at abstract (issued April 3, 1990) (emphasis added). The specification of the Signtech '957 patent states:

Ink sprayhead 70 comprises ink jet 71 coupled to a constant air pressure source (not shown) via passage 72 which provides a continuous supply of air across ink jet 71. . . . At the beginning of a pixel print, ink valve 73 opens to allow the flow of ink to ink jet 71. *The air stream delivered past ink jet 71 picks up the ink and applies it to the substrate.*

'957 patent, *supra* note 10, at col. 10, ll. 35-43 (emphasis added).

83. The specification of the Vutek '522 patent states: "[I]n the present system, the ink flow is interrupted at the end of each pixel and the system allowed to come to equilibrium before the ink is again turned on." '522 patent, *supra* note 82, at col. 3, ll. 44-46. The specification of the Signtech '957 patent states:

At the beginning of a pixel print, ink valve 73 opens to allow the flow of ink to ink jet 71. The air stream delivered past ink jet 71 picks up the ink and applies it to the substrate. When the desired pixel density is reached, ink valve 73 closes, and the flow of ink from ink jet 71 ceases.

'957 patent, *supra* note 10, at col. 10, ll. 40-45.

84. The specification of the Signtech '957 patent states: "Ink sprayhead 70 differs from the ink sprayheads of the preferred embodiment because *the ink flow is modulated* to control the color density rather than the air supply." '957 patent, *supra* note 10, at col. 10, ll. 32-35 (emphasis added). The specification of the Vutek '522 patent states: "A flow of constant-pressure air is pulse-width modulated in accordance with the control signals and passed over an ink meniscus maintained on the end of a small nozzle. *The pulse-*

out explanation, that "Signtech's alternative structure is so different from Vutek's accused device that no reasonable jury could find it an equivalent structure."⁸⁵

The Federal Circuit's abrupt dismissal of equivalence in Signtech may seem surprising in light of the similarities between the alternative embodiment and the accused device. The Federal Circuit seemed to conclude that because Vutek's device did not possess a structure equivalent to Signtech's alternative embodiment, it could not be an "equivalent" under section 112, paragraph 6. This supposed requirement of "structural equivalence" is supported by an analysis of recent Federal Circuit cases, which shows that structural equivalence has become an important element of section 112, paragraph 6 equivalence.

2. Section 112, paragraph 6 equivalence in recent Federal Circuit cases

In *Valmont Industries, Inc. v. Reinke Manufacturing Co., Inc.*,⁸⁶ another case involving interpretation of a means-plus-function claim, the Federal Circuit reversed a district court's finding of infringement because the accused device was structurally different than the means disclosed in the patent specification.⁸⁷ In that case, Valmont sued Reinke for infringing its patent, which covered a device for watering the corners of a field missed by a center pivot irrigator.⁸⁸ Both Valmont's means for a self-propelled irrigation apparatus and the means of Reinke's accused apparatus used electric signals.⁸⁹ The difference between the two devices was the source of the electric signals: Valmont's control means sensed the angular relations between the main arm and the extension arm, while Reinke's structure sensed electromagnetic signals from a buried cable.⁹⁰ Although the district court found infringement, the Federal Circuit reversed, reasoning that "the structures generating [the electric] signals are strikingly different."⁹¹ There was no discussion of what made the structures sufficiently different to result in a finding of noninfringement.⁹²

modulated air flowing across the meniscus causes the ink to be sprayed onto the recording medium." '522 patent, *supra* note 82, at abstract (emphasis added).

85. *Signtech* at 1357.

86. 983 F.2d 1039 (Fed. Cir. 1993).

87. *See id.* at 1045.

88. *See id.* at 1040.

89. *See id.* at 1044.

90. *See id.*

91. *Id.*

92. *See id.*

The Federal Circuit reached a similar result in *Chiuminatta Concrete Concepts, Inc. v. Cardinal Industries, Inc.*⁹³ In that case, Chiuminatta sued Cardinal for infringement of its patented apparatus for cutting concrete.⁹⁴ The claim at issue recited “means . . . for supporting the surface of the concrete.”⁹⁵ Chiuminatta’s patent specification disclosed the use of a flat, hard plate fixedly attached to the saw, called a “skid plate,” to support the concrete.⁹⁶ The support means in Cardinal’s accused device were soft, round wheels that were rotatably mounted onto the saw.⁹⁷ Chiuminatta argued that the wheels of the accused device were equivalent to a skid plate because “in use, [Cardinal’s] wheels compress[ed] to form flattened planes on each side of the saw blade, coinciding with the structure of a skid plate.”⁹⁸ The Federal Circuit disagreed, however, concluding that Chiuminatta’s skid plate and Cardinal’s wheels were “substantially different” from each other.⁹⁹ As in *Valmont*, there was little discussion of what made the structures so different as to result in a finding of noninfringement.

Another case illustrating the importance of structural equivalence in means-plus-function caselaw is *Alpex Computer Corp. v. Nintendo Co. Ltd.*¹⁰⁰ In that case, Alpex sued Nintendo for infringement of a patent for a microprocessor-based home video game system.¹⁰¹ Nintendo’s expert testified that both the accused Nintendo system and Alpex’s disclosed device stored data and eventually displayed an image on the whole screen.¹⁰² The Federal Circuit rejected the expert testimony, however, because it “was based only on a functional, not a structural, analysis.”¹⁰³ This suggests that Nintendo escaped infringement because the structure of its product was different from the structure disclosed in Alpex’s specification.

These cases demonstrate that for a means-plus-function claim to read on an accused device, the accused device must possess structure that is equivalent to some structure disclosed in the patent specification. The Federal Circuit was faithful to this principle in *Signtech*, finding noninfringement because Vutek’s accused device was structurally different from

93. 145 F.3d 1303 (Fed. Cir. 1998).

94. *See id.* at 1305.

95. *Id.*

96. *See id.* at 1308.

97. *See id.* at 1309.

98. *Id.*

99. *See id.*

100. 102 F.3d 1214 (Fed. Cir. 1996).

101. *See id.* at 1215-16.

102. *See id.* at 1222.

103. *Id.*

anything disclosed in Signtech's specification. As will be argued below, however, this requirement of "structural equivalence" has the effect of eliminating the phrase "and equivalents thereof" from the language of section 112, paragraph 6.

3. *Rethinking structural equivalence*

The concept of structural equivalence, as applied to means-plus-function claims, was judicially created by the Federal Circuit.¹⁰⁴ The language of section 112, paragraph 6 does not refer to structural equivalence.¹⁰⁵ The Court of Claims and Patent Appeals, which heard patent appeals before the Federal Circuit was created, and whose decisions bind the Federal Circuit,¹⁰⁶ stated: "We take the characterization 'functional' . . . to indicate nothing more than the fact that an attempt is being made to define something . . . by what it does rather than by what it is (as evidenced by specific structure or material, for example)."¹⁰⁷ In fact, according to one commentator, even the Federal Circuit did not begin to speak of structural equivalence until 1988.¹⁰⁸

The Federal Circuit's structural equivalence requirement has been criticized. In *Baltimore Therapeutic Equip. Co. v. Loredan Biomedical, Inc.*,¹⁰⁹ Judge Rich commented, in a concurring opinion, that section 112, paragraph 6 "does not necessarily mean that a structural equivalent of what the specification discloses must be used."¹¹⁰ In *De Graffenried v. United States*,¹¹¹ the United States Claims Court argued that "the term 'equivalent' in section 112 should not be interpreted as being limited to structures that are 'equivalent' to the physical structure of the 'means' disclosed in a patent."¹¹² And it has been argued that the "structural equiva-

104. See Mark D. Janis, *Who's Afraid of Functional Claims? Reforming the Patent Law's § 112, ¶ 6 Jurisprudence*, 15 SANTA CLARA COMPUTER & HIGH TECH L.J. 231, 259 (1999) ("Prior to the Federal Circuit era, courts referred to structural equivalency only rarely and in passing, and never, insofar as I have been able to determine, in the context of § 112, ¶ 6 determinations.").

105. Rather, it speaks of "the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 (1994).

106. See *South Corp. v. United States*, 690 F.2d 1368, 1369 (Fed. Cir. 1982) ("We hold that the holdings of . . . the United States Court of Customs and Patent Appeals . . . shall be binding as precedent in this court.").

107. *In re Swinehart*, 439 F.2d 210, 212 (C.C.P.A. 1971) (emphasis added).

108. See Janis, *supra* note 104, at 260 n.104.

109. Nos. 93-1301, 93-1331, 1994 WL 124022 (Fed. Cir. April 12, 1994) (unpublished opinion).

110. *Id.* at *7.

111. 20 Cl. Ct. 458 (Cl. Ct. 1990).

112. *Id.* at 479-80.

lence" requirement undermines the usefulness of means-plus-function claims.¹¹³

These criticisms arise from the same concern, namely that competitors can avoid literal infringement of a means-plus-function claim by simply replacing the structures specifically described in the patent specification with different structures that operate in substantially the same way.¹¹⁴ Considering its recent means-plus-function caselaw, it is questionable whether the Federal Circuit has in fact allowed accused devices with trivial, structural differences to avoid infringement of means-plus-function claims. In *Valmont* the difference was the source of the electric signals.¹¹⁵ In *Chiuminatta* the difference was the kind of supporting surface.¹¹⁶ And in *Signtech*, the difference was the structure that controlled the supply of ink to the ink jets.¹¹⁷ Whether these changes are meaningful or trivial is colorable, and should be analyzed, not inferred as a result of structural differences.

It might be argued that any trivial differences between the patentee's disclosure and the accused device would be addressed by the doctrine of equivalents. That is, if Vutek's modulation of an air source, as opposed to modulation of ink valves, was nothing more than "an insubstantial change which adds nothing of significance,"¹¹⁸ *Signtech* could have proven infringement under the doctrine of equivalents.¹¹⁹ The Federal Circuit, however, has held that patentees are precluded from presenting evidence regarding infringement of a means-plus-function claim under the doctrine of equivalents.¹²⁰ In the present case, such a holding makes the question of

113. See Janis, *supra* note 104, at 262.

114. See *id.*

115. See *Valmont Indust., Inc. v. Reinke Mfg. Co., Inc.*, 983 F.2d 1039, 1044 (Fed. Cir. 1993).

116. See *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1309 (Fed. Cir. 1998).

117. See *supra* note 84.

118. *Valmont Indus. v. Reinke Mfg.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993). The Federal Circuit in *Valmont* stated: "[t]he word 'equivalent' in section 112 invokes the familiar concept of an insubstantial change which adds nothing of significance."

119. In *Signtech*, the parties did not present evidence concerning infringement under the doctrine of equivalents. See *Signtech USA Ltd. v. Vutek Inc.*, 174 F.3d 1352, 1358 (Fed. Cir. 1999).

120. See *Chiuminatta*, 145 F.3d at 1311 ("[A] finding of non-equivalence for section 112, paragraph 6, purposes should preclude a contrary finding under the doctrine of equivalents."). Other cases have reached the opposite conclusion. See, e.g., *Kahn v. General Motors Corp.*, 135 F.3d 1472 (Fed. Cir. 1998) (finding infringement of a means-plus-function claim element under the doctrine of equivalents, even though the defendant's accused device did not literally infringe).

the “insubstantiality” of the differences between Vutek’s modulation of an air source and Signtech’s modulation of an ink valve wholly irrelevant. And in general, such a holding limits the patentee to structures that are explicitly disclosed in the patent specification—not trivial modifications of those structures, and certainly not the “equivalents” contemplated in section 112, paragraph 6.

Consequently, the Federal Circuit should either eliminate the structural equivalence requirement, or clarify that the doctrine of equivalents does apply to means-plus-function claim elements. If the former, then competitors could not escape literal infringement by making trivial, structural modifications to their accused devices. And if the latter, then certainly such trivial modifications would be found liable of infringement under the doctrine of equivalents. Either way, means-plus-functions claims would be construed to “cover,” for purposes of determining infringement, the “equivalents” contemplated in section 112, paragraph 6.

IV. CONCLUSION

After *Signtech*, patent drafters have reason to be both encouraged and slightly dismayed. Many of Signtech’s problems could have been avoided with careful, deliberate drafting of the patent specification. At the same time, however, *Signtech* added to the growing list of cases that require structural equivalence for literal infringement of a means-plus-function claim. With infringement under the doctrine of equivalents possibly unavailable for means-plus-function claims, the language of section 112, paragraph 6 may become like Signtech’s “ink delivery means”—mere words that have little value in a court of law.

