United States District Court,
D. Minnesota.

The TORO COMPANY,
Plaintiff.
v.
JOHN DEERE & COMPANY,
Defendant.

No. Civ. 99-725 (DSD/JMM)

June 12, 2001.

Owner of patents for turf aeration method and devices sued competitor for infringement. On cross motions for summary judgment, the District Court, Doty, J., held that: (1) method patent was not invalid as anticipated; (2) method patent was literally infringed; and (3) device patents were neither literally nor equivalently infringed.

Motions granted in part and denied in part.

5,207,168. Construed, Valid, Infringed.

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ORDER

DOTY**, District Judge.**

This matter is before the court on the cross-motions of the parties for summary judgment. Based on a review of the file, record, and proceedings herein, and for the reasons stated, plaintiff's motion is granted in part and denied in part, and defendant's motion is granted in part and denied in part.

BACKGROUND

This action involves the alleged infringement of three patents relating to an aerating method and machine that uses liquid jets to penetrate the soil for cultivation. Plaintiff Toro Company ("Toro") is a well-known manufacturer of equipment used in treating and maintaining turf. Toro's commercial division manufactures and sells the HydroJect 3000, a machine designed to aerate and loosen compacted soil without disturbing

the turf surface and without leaving the "plugs" of dirt that result from other aeration methods. This invention helps grass grow in high traffic areas such as golf courses. The machine accomplishes this by utilizing a plurality of nozzles to periodically inject water under high pressure into the turf to create openings and aerate the soil. The nozzles are specifically spaced on a frame and situated at a specified distance above the turf.

Toro is the owner of three United States patents relating to the HydroJect 3000: U.S.Patent Nos. 5,101,745 (the " '745 patent"), 5,119,744 (the " '744 patent") and 5,207,168 (the " '168 patent"). The '168 patent focuses on the method of treating the turf. The '744 and '745 patents focus on the design of the machine that performs the method of the '168 patent.

Defendant John Deere and Company ("Deere") is a well-known manufacturer of agricultural, construction and turf care equipment. Deere manufactures a machine known as the RZI 700. This machine is designed to inject chemicals, such as fertilizers and pesticides, into the root zone of the turf. Plaintiff alleges that the RZI 700 infringes all three of its patents. Defendant denies infringement and asserts that it is entitled to a declaration of non-infringement as a matter of law. Both parties now move for summary judgment. For the reasons stated, the court grants plaintiff's motion as it relates to the '168 patent and grants defendant's motion as it relates to the '744 and '745 patents.

DISCUSSION

A. Summary Judgment Standard

The court applies the same summary judgment standard to motions involving patent claims as it does to motions involving other types of claims. *See* Avia Group Int'l, Inc. v. L.A. Gear California, Inc., 853 F.2d 1557, 1561 (Fed.Cir.1988). Summary judgment is appropriate when the evidence of record establishes that no genuine issue of material fact remains in dispute and the movant is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c); Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986). A court should grant summary judgment "if the pleadings, depositions, answers to interrogatories, and omission on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed.R.Civ.P. 56(c). There is no genuine issue for trial unless there is sufficient evidence favoring the nonmoving party for a jury to return a verdict for that party. Anderson, 477 U.S. at 249, 106 S.Ct. 2505.

On a motion for summary judgment, the court views the evidence in favor of the nonmoving party and gives that party the benefit of all justifiable inferences that can be drawn in its favor. *Id*. at 250, 106 S.Ct. 2505. The nonmoving party, however, cannot rest upon mere denials or allegations in the pleadings. *Id*. Nor may the nonmoving party simply argue that facts supporting its claims may be developed later or at trial. *Id*. Rather, the nonmoving party must set forth specific facts, by affidavit or otherwise, to raise a genuine issue of fact for trial. Celotex Corp. v. Catrett, 477 U.S. 317, 324, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986). Where the record taken as a whole could not lead a rational trier of fact to find for the nonmoving party, there is no genuine issue for trial. Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp., 475 U.S. 574, 587, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986).

B. Patent Infringement

[1] [2] [3] The owner of a patent may recover for infringement if the defendant "without authority makes, uses, offers to sell, or sells any patented invention ..." 35 U.S.C. s. 271(a) (2000). The patent holder has the

burden of proving infringement by a preponderance of the evidence. *See* Lemelson v. United States, 752 F.2d 1538, 1547 (Fed.Cir.1985). An infringement analysis requires two steps. The first is to construe the meaning and scope of the patent claims. Southwall Tech., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed.Cir.1995). The second is to determine whether the accused invention infringes the patent claims as construed. Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed.Cir.1995). A product infringes a patent if it contains every limitation of any one claim or an equivalent of each limitation not literally met. Dolly, Inc. v. Spalding & Evenflo Cos., Inc., 16 F.3d 394, 397 (Fed.Cir.1994); Becton Dickinson & Co. v. C.R. Bard, Inc., 922 F.2d 792, 796 (Fed.Cir.1990). While the first step is solely a question of law to be determined by the court, the second step is one for the trier of fact. *Id.*

[4] If the parties do not dispute any relevant facts about the accused invention but instead assert two different meanings for the patent's claims, then "the question of literal infringement collapses to one of claim construction and is thus amenable to summary judgment." Athletic Alternatives, Inc. v. Prince Mfg. Inc., 73 F.3d 1573, 1578 (Fed.Cir.1996). Even if the parties disagree about the meaning of key terms in the patent claims, summary judgment may be appropriate since a mere dispute over the meaning of a term does not in itself create an issue of fact. *Id.*

1. The '168 Patent

The '168 patent relates to a turf treating aeration method. While plaintiff alleges that defendant has infringed a number of claims in the '168 patent, for purposes of the present motion, the parties limit their argument to claim 1 of that patent. Claim 1 reads as follows:

A turf treating method comprising: (a) creating a source of relatively high pressure incompressible liquid, (b) periodically injecting jets of said incompressible liquid from above said turf through the turf into soil below the turf at a pressure that will cause a lateral dispersion of the liquid within said soil, (c) moving said source of incompressible liquid over the surface of said turf in a pattern such that the lateral dispersion from adjacent jets coact with one another to lift and fracture the soil and reduce the general soil density.

The parties concede that the purported infringing device performs steps (a) and (b). Therefore, only clause (c) is in dispute.

a. Claim Construction of the '168 Patent

[5] [6] [7] Claim construction involves ascertaining the true meaning and scope of each claim as a matter of law. *See* Markman v. Westview Instruments, Inc., 517 U.S. 370, 386, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996); Intellicall, Inc. v. Phonometrics, Inc., 952 F.2d 1384, 1387 (Fed.Cir.1992) (holding that claim construction is particularly amenable to summary judgment). In determining the meaning of the terms of the claims, the court considers "intrinsic" evidence, which consists of the language of the claims, the specification of the patent and the prosecution history. *See* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). If the meaning of the claim terms is not ambiguous and can be determined from the intrinsic evidence, the court need not rely on extrinsic evidence in rendering its claim construction. *See id.* at 1583. Courts should give the words of a claim their ordinary and accustomed meaning, unless it appears that the inventor used them differently. *See* ZMI Corp. v. Cardiac Resuscitator Corp., 844 F.2d 1576, 1579 (Fed.Cir.1988).

The parties concede that the '168 patent raises no real claim construction issues and as such the terms and phrases should be given their ordinary meaning. Thus, the chief issue for the court to resolve is whether the

RZI 700 infringes claim 1 of the '168 patent.

b. Infringement of the '168 Patent

While plaintiff contends that defendant's device literally infringes on claim 1, defendant asserts the affirmative defense of invalidity arguing that the '168 patent was anticipated by U.S.Patent No. 4,907,516 (" '516 patent"). FN1 Defendant contends that the RZI 700 merely practices the prior art taught by the '516 patent. Plaintiff disagrees and asserts that the RZI 700 practices the teachings of the '168 patent not the '516 patent.

FN1. The '516 patent relates to a technique for pulsed direct injection into the ground of liquid fertilizer or other crop treatments. The '516 patent was issued on March 13, 1990 to Ramon B. Rogers. Rogers is also the designer of defendant's RZI 700. The '168 patent was issued on May 4, 1993. The parties do not dispute that the '516 patent was before the patent examiner at the same time that the '168 patent was prosecuted and issued.

i. Validity of the '168 Patent

[8] [9] [10] In order for a patent to be valid, the invention must be novel. 35 U.S.C. s. 102(a). An invention is not novel if it is anticipated by the prior art. *Id*. Anticipation specifically occurs when the invention was "known or used by others in this country, or patented" before its invention. *Id*. The standard for anticipation is rigorous. Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1565 (Fed.Cir.1992). The challenger must show by clear and convincing evidence that a single prior art reference discloses every element of the challenged claim and enables one skilled in the art to make the anticipating subject matter. *See* PPG Indus., Inc. v. Guardian Indus. Corp., 75 F.3d 1558, 1566 (Fed.Cir.1996); Scripps Clinic & Research Found. v. Genentech, Inc., 927 F.2d 1565, 1576 (Fed.Cir.1991). The classic test for anticipation is whether the prior art reference would infringe if it followed, rather than preceded the patent at issue. *See* Knapp v. Morss, 150 U.S. 221, 228, 14 S.Ct. 81, 37 L.Ed. 1059 (1893); Lindemann Maschinenfabrik GMBH v. Am. Hoist & Derrick Co., 730 F.2d 1452, 1458 (Fed.Cir.1984). Thus, a claim is anticipated if each and every limitation found in the claim is either explicitly or inherently found in a single prior art reference. Atlas Powder Co. v. Ireco Inc., 190 F.3d 1342, 1346 (Fed.Cir.1999); Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 677 (Fed.Cir.1988) ("[f]or a prior art reference to anticipate in terms of 35 U.S.C. s. 102, every element of the claimed invention must be identically shown in a single reference").

[11] [12] Defendant asserts that since claim 1 of the '168 patent includes a "range" taught by the '516 patent, it is inherently anticipated. Plaintiff counters that there is no anticipation on two bases: First, the U.S.Patent Office decided this issue adverse to defendant's position when it issued the '168 patent despite the fact that the '516 patent was before the examiner at the same time; FN2 and second, the measurements and teachings of the '168 patent are contrary to those described in the '516 patent. In particular, plaintiff points out that the '516 patent does not directly or inherently teach a method of soil aeration as claimed in the '168 patent. Furthermore, plaintiff argues that the coaction necessary to lift and fracture the soil is unique to the '168 patent and is not directly or inherently found in the '516 patent.FN3

FN2. A patent is presumed to be valid and any party asserting invalidity must overcome the presumption by clear and convincing evidence. Texas Instruments Inc. v. U.S. Int'l Trade Comm'n, 988 F.2d 1165, 1177 (Fed.Cir.1993). A court "owes some deference" to the Patent Office's decision when it has issued a patent notwithstanding the prior art. Minnesota Mining Mfg., 976 F.2d at 1572. *See* Hewlett-Packard Co. v.

Bausch & Lomb, Inc., 909 F.2d 1464, 1467 (Fed.Cir.1990) (stating that "the burden of showing ... invalidity ... is especially difficult when the prior art was before the PTO examiner."). *See also* Am. Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1359 (Fed.Cir.1984) (discussing the burden of overcoming the deference given to the PTO when alleging that the prior art invalidates a patent).

FN3. A process or method patent can only be anticipated by a similar process or method. *See* Carnegie Steel Co. v. Cambria Iron Co., 185 U.S. 403, 424, 22 S.Ct. 698, 46 L.Ed. 968 (1902); Smith v. Goodyear Dental Vulcanite Co., 93 U.S. 486, 499-500, 23 L.Ed. 952 (1876), Am. Original Corp. v. Jenkins Food Corp., 696 F.2d 1053, 1058 (4th Cir.1982).

[13] [14] [15] After a careful review of the record, the court agrees with the plaintiff that the '516 patent does not directly or inherently anticipate the aeration method described in claim 1 of the '168 patent. Inherency may not be established by probabilities or possibilities. Finnigan Corp. v. U.S. Int'l Trade Comm'n, 180 F.3d 1354, 1365 (Fed.Cir.1999). The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish anticipation. Continental Can Co. USA, Inc. v. Monsanto Co., 948 F.2d 1264, 1269 (Fed.Cir.1991). To prove anticipation when the prior art reference is silent about the asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by one of ordinary skill in the art. *Id.* at 1268. That elements in a prior art reference can be used other than as are disclosed and for a different function is not sufficient in and of itself to establish inherency. In re Robertson, 169 F.3d 743, 745 (Fed.Cir.1999).

The '168 patent elucidates specific parameters for building a machine to produce a pattern of coacting lateral liquid dispersions to lift and fracture the soil and thereby reduce soil density. The '516 patent does not teach these parameters. In fact, the '516 patent teaches values outside the ranges disclosed in the '168 patent. The '516 patent does not describe, teach or even suggest that the liquid jets may be used to aerate or cultivate the soil. To the contrary, '516 patent specifically describes as an advantage of the invention that there is "[n]o soil disturbance." (Column 2, Lines 47-49.)

The court concludes that no reasonable factfinder could find that one of skill in the art would discern from the '516 patent the unique combination of all of the necessary parameters to produce the aeration method claimed in the '168 patent. In other words, the '516 patent does not inherently "read on" or teach the parameters necessary to produce the pattern needed to create the method of aeration claimed in the '168 patent. The '516 patent does not thus anticipate the '168 patent. The '168 patent is valid.

ii. Infringement of '168 Patent

[16] Moreover, defendant fails to set forth any evidence that the RZI 700 does not lift and fracture soil. Rather, the evidence reflects that RZI 700 uses all of the requisite parameters taught by claim 1 of the '168 patent. In particular, the undisputed record indicates that defendant's device copies the nozzle spacing, height of the nozzles, system pressure, duration of shot times, speed of machine, and use of an accumulator. Defendant's own counsel acknowledges that the RZI 700 infringes the '168 patent as do defendant's employees. (*See* Letter Opinion, Hamer Decl.Ex. Q (pp. D009085, D009126-27); and Greif Ex. 29 (p. D001996), Hamer Decl.Ex. V.) The designer of the RZI 700 also directly acknowledges that the RZI 700 produces coaction that lifts and fractures the soil. (*See* Rogers Dep. at 238-239, Hammer DeclEx. H.)

The court thus determines that the RZI 700 literally infringes claim 1. Plaintiff is entitled to summary judgment on the infringement of the '168 patent as a matter of law.

2. The '744 Patent

Plaintiff alleges that defendant's RZI 700 infringes a number of claims in the '744 patent, however, for purposes of the present motion, the parties limit their argument to claims 1 and 17 of that patent.

a. Claim Construction of '744 Patent

i. Claim 1

Claim 1 of the '744 patent reads as follows:

A turf treating machine comprising:

(a) a frame;

(b) means connected to said frame for propelling said frame over the turf to be treated;

(c) a plurality of fluid nozzles mounted on said frame, each of said fluid nozzles being a specified distance apart from adjacent nozzles and having an input port and an output port, the output port of each nozzle being a specified distance above said turf;

(d) pressurized fluid generating means mounted on said frame.

(e) control means connecting said pressurized fluid generating means to the input ports of each of said nozzles so as to produce periodic fluid injections from the output port of each said nozzle at a system pressure sufficient, commensurate with the spacing of said nozzles, to cause said fluid to penetrate through said turf into the soil in a first direction and at the same time create a dispersion of said fluid in a direction generally outward from said first direction of penetration sufficient to coact with dispersion patterns from adjacent nozzles to lift and fracture the soil so as to reduce the general turf and turf subsoil density.

The parties agree that the only disputed clauses in claim 1 are (d) and (e).

[17] Defendant contends that clauses (d) and (e) of claim 1 are means-plus-functions clauses while plaintiff counters that these are not. Whether a claim limitation is in means-plus-function format is a matter of claim construction and is thus a question of law. *See* Kemco Sales, Inc. v. Control Papers Co., Inc., 208 F.3d 1352, 1360 (Fed.Cir.2000). Title 35 s. 112, para. 6 provides that a patentee may define the structure for performing a particular function generically through the use of a means expression, provided however that it discloses specific structure corresponding to that means in the patent specification. *See* 35 U.S.C. s. 112, para. 6.FN4 *See also* Valmont Indus., Inc. v. Reinke Mfg. Co., Inc., 983 F.2d 1039, 1042 (Fed.Cir.1993) (explaining that the patent applicant must describe in the specification some structure which performs the specified function recited in the limitation). The Federal Circuit has referred to s. 112, para. 6 as embodying a statutory "quid pro quo" since the duty to link or associate structure to function is exchanged for the convenience of utilizing s. 112, para. 6. *See* Kemco, 208 F.3d at 1360; B. Braun Medical, Inc. v. Abbott Labs., 124 F.3d 1419, 1424 (Fed.Cir.1997).

FN4. Section 112, para. 6 specifically provides:
An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. s. 112 (2000).
[18] Once a court establishes that a means-plus-function limitation is at issue, it must construe that limitation to determine what the claimed function is and what structure is disclosed in the written specification that corresponds to the "means" for performing that function. Kemco, 208 F.3d at 1360; Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1308 (Fed.Cir.1998) (after establishing that a means-plus-function limitation is at issue, the district court must construe the function recited and determine what structure has been disclosed in the specification that corresponds for performing that function); Odetics, Inc. v. Storage Tech. Corp., 185 F.3d 1259, 1264 (Fed.Cir.1999) (claim limitations written as means-plus-function limitations pursuant to 35 U.S.C. s. 112, para. 6 must be construed to cover the structure described in the patent specification for accomplishing the recited function and any equivalents thereof). A court, however, may not import functional limitations that are not recited in the claim or structural limitations from the written description that are unnecessary to perform the claimed function. Wenger Mfg., Inc. v. Coating Mach. Sys., Inc., 239 F.3d 1225, 1233 (Fed.Cir.2001).

[19] [20] Use of the term "means" in a claim limitation creates a presumption that s. 112, para. 6 has been invoked, but that presumption may be rebutted if the properly construed claim limitation itself recites sufficientlydefinite structure to perform the claimed function. *See* Kemco, 208 F.3d at 1361. Conversely, absence of the word "means" creates a presumption that s. 112, para. 6 has not been invoked, but that presumption may likewise be rebutted if the claim limitation is determined not to recite sufficiently definite structure to perform the claimed function. *See id.*

In particular, plaintiff argues that in clause (d) no function can be associated with the term "means," and thus this clause can only be construed as reflecting an "apparatus" providing pressurized fluid. Plaintiff also argues that both clauses (d) and (e) recite sufficient structure to remove them from treatment under s. 112, para. 6. Plaintiff lastly contends that even if clauses (d) and (e) are construed as means-plus-function clauses, the RZI 700 still infringes as a s. 112, para. 6 equivalent.FN5

FN5. Plaintiff specifically asserts that defendant's solenoid actuated valve system is the equivalent of plaintiff's mechanical cam actuated valve system when considered "within the context of the invention as a whole." (Pl.'s Reply Mem.Supp.Summ.J. at 11.)

[21] After a careful review of the '744 patent, the court determines that clause (d) of claim 1 is not a means-plus-function clause. Clause (d) calls for a "pressurized fluid generating means." Although containing the word "means," the court agrees with plaintiff that in the absence of an associated function, the use of this word does not signal a means-plus-function clause, but rather indicates an "apparatus providing pressurized fluid." Simply put, in clause (d) there is no function associated with the word "means." Any person of ordinary skill in the art would agree that this element merely refers to an apparatus for providing pressurized fluid, i.e., a pump. Clause (d) is thus construed as covering an apparatus to provide pressurized fluid, i.e., a

pump.

[22] However, with respect to clause (e) of claim 1, the court concludes that this clause reflects a means-plus-function clause. This limitation clearly recites a function involving the controlled production of periodic fluid injections to the input ports of the individual nozzles so as to produce the periodic fluid dispersions from the output port of each nozzle. This function is necessary to create the coaction of pressurized fluid to lift and fracture the soil.

Moreover, since clause (e) fails to recite the additional structure needed to perform this function, it must be construed to include the conduit system that joins the pressurized fluid generating means, or pump, and the input port of each nozzle *coupled* with a control means capable of producing periodic fluid injections. Since no structure is recited in clause (e) for this control means, the court must turn to the patent specification for a description of the additional structure needed to accomplish the function of producing and controlling the pressurized fluid.

The structure disclosed in the patent specification includes a mechanical cam system. This mechanical cam system drives the valve stem of the metering valve that controls and periodically allows the pressurized liquid to flow from the accumulator through the valve system. (*See* Patent '744, Col. 9, Lines 40-46.) It is this structure that ultimately produces and controls the dispersion of the pressurized liquid out of the nozzle output ports in a coacted dispersion pattern sufficient to effect the lifting and fracturing of the soil so as to reduce sub-soil density of the turf.

Plaintiff implicitly acknowledges that this construction is correct since plaintiff concedes that the language of clause (e) regarding the "control means" specifically:

... calls out a conduit system between the pressurized fluid generating means and the input port of each nozzle together with a control device capable of controlling fluid flow through the conduit system and producing fluid injections. This control device is in the form of a metering device or valve that be cycled or pulsed so as to produce fluid injections from the output port of each nozzle. *See* '744 Col 7, line 63 to Col. 8, line 8.

(Pl.'s Mem.Opp.Summ.J. at 8.)

Plaintiff further acknowledges that " 'control means' does not evoke one particular structure which controls fluid flow," but that it conveys "a variety of such structures." (*Id.*)

Since the cam structure actuates the controlling device, it is an indispensable part of the "control means" structure required by clause (e). Accordingly, the court construes the claim to include the mechanical cam system since it is part of the structure that controls the fluid flow.

ii. Claim 17

Claim 17 reads:

A turf treating machine comprising:

(a) a frame;

(b) a drive mechanism connected to said frame for moving said frame in a given direction, and at a controlled speed, over the turf to be treated;

(c) a plurality of fluid nozzles operatively connected to said frame a specified distance apart from adjacent nozzles, each of said nozzles having an input and an output;

(d) a pressurized source of generally incompressible liquid operatively connected to said frame, said pressurized source having an output;

(e) a valve having an input and an output;

(f) a fluid conduit mechanism connected between the output of said pressurized source of generally incompressible liquid and the input of said valve;

(g) a fluid conduit connected between the output of said valve and the inputs of each of said plurality of fluid nozzles;

(h) control mechanism for controlling the operation of said valve and the movement of said frame over the turn to be treated such that the valve periodically releases high pressure jets of generally incompressible liquid from the output of the nozzles at an output pressure commensurate with the speed of the frame over the turf and the spacing of said nozzles so that said jets of liquid penetrate through the turf into the soil such that the dispersion pattern from the output of each nozzle in the soil generally coacts with the dispersion pattern of adjacent nozzles so as to lift and fracture the soil and reduce the general turf and turf subsoil density.

As will be discussed, the parties do not agree on which specific clauses are disputed in claim 17. Plaintiff alleges that (b) and (h) are in dispute, while defendant seems to argue, without explanation, that clauses (d) and (e) are in dispute. (Def.'s Mem.Opp.Summ.J. at 24.) Defendant fails to brief this claim sufficiently, and in a conclusory fashion asserts that, "[f]or the same reasons, Deere does not infringe claim 17 of the '744 patent either." (*Id*. at 30.) In a footnote, defendant also indicates that clause (h) of claim 17 must be construed as a means-plus-function limitation since it recites insufficient structure. (*Id*. at 29.) Given this inexactitude and the court's ultimate finding of non-infringement on this claim, the court will limit its construction to clauses (b), (e) and (h) of claim 17.

[23] Clause (b) recites "a drive mechanism connected to [the machine's] frame for moving [the machine] in a given direction, and at a controlled speed, over the turf to be treated." (Patent '744, Col. 13, Lines 31-33.) The court concludes that this is not a means-plus-function clause. This clause does not lack sufficient structure to warrant construction under a means-plus-function analysis, nor is there language signaling that s. 112, para. 6 should apply. An ordinary interpretation and construction of this claim therefore must include two components: (1) a *drive mechanism,* i.e., some form of mechanized propulsion; FN6 that is (2) *connected* to the machine's frame for providing this propulsion. The common understanding of the word "connected" suggests: "joined, linked or incapable of being separated." *See, e.g., Merriam Webster's Collegiate Dictionary* 244-245 (10th ed.1998).

FN6. Such as an engine system comprised, in part, of a hydraulic drive motor as disclosed in the patent specification. (*See* Patent '744, Col. 5, Lines 58-60; and Col. 6, Lines 50-53.)

[24] Clause (e) indicates "a valve having an input and output." (Patent '744, Col. 13, Line 41.) There is also no means-plus-function language in this clause nor paucity of sufficient structure. Thus, this limitation must be construed to reflect the ordinary meaning of the language, in other words, a valve that has in and out ports.

Since clause (h) does not disclose a function nor fails to disclose sufficient structure, the court also concludes that there is no means-plus-function language invoked by this clause. It must therefore be construed to recite its ordinary and unambiguous language of delineating a "control mechanism for controlling the operation of [the conduit] valve and the movement of [the device's] frame over the turf to be treated in a way that the valve periodically releases high pressure jets ... from the output of the nozzles at output pressure commensurate with the speed of the frame over the turf" so as to create the lifting and fracturing coaction needed to reduce subsoil compaction. (*Id.,* Col. 13, Line 48-60.)

b. Infringement of the '744 Patent

After the claims are construed as a matter of law, the court must consider whether "a reasonable trier of fact could find that every limitation in any construed claim at issue" may be found in the accused device. Unidynamics Corp. v. Automatic Products Int'l, Ltd., 157 F.3d 1311, 1316-17 (Fed.Cir.1998). FN7 Thus, the court must now compare the claims as construed to the allegedly infringing device.

FN7. The determination of whether an accused device infringes a s. 112, para. 6 claim literally or under the doctrine of equivalents is normally a question of fact. Caterpillar Inc. v. Deere & Co., 224 F.3d 1374, 1379 (Fed.Cir.2000). However, a district court may grant summary judgment "when it is shown that the infringement issue can be reasonably decided only in favor of the movant, when all reasonable factual inferences are drawn in favor of non-movant." Voice Tech. Group, Inc. v. VMC Sys., Inc., 164 F.3d 605, 612 (Fed.Cir.1999).

i. Literal Infringement

[25] Literal infringement of a claim occurs when every limitation recited in the claim appears in the accused device, or put differently, when "the properly construed claim reads on the accused device exactly." DeMarini Sports Inc. v. Worth, Inc., 239 F.3d 1314, 1331 (Fed.Cir.2001) (quoting Amhil Enters. Ltd. v. Wawa, Inc., 81 F.3d 1554, 1562 (Fed.Cir.1996)); Dolly, Inc., 16 F.3d at 397 (an accused device must include every claim limitation of the claim). If just one limitation is missing or is not met as claimed, there is no literal infringement. London v. Carson Pirie Scott & Co., 946 F.2d 1534, 1539 (Fed.Cir.1991); Mas-Hamilton Group v. La Gard, Inc., 156 F.3d 1206, 1211 (Fed.Cir.1998).

[26] In order for an accused device to literally infringe a s. 112, para. 6 means-plus-function limitation, the accused device must have structure to perform the identical function recited in the claim. Wenger, 239 F.3d at 1238 (citing Odetics, 185 F.3d at 1267). In addition, the structure in the accused device must be either identical or equivalent to the corresponding structure in the specification. *Id.;* Johnston v. IVAC Corp., 885 F.2d 1574, 1580 (Fed.Cir.1989); WMS Gaming Inc. v. Int'l Game Tech., 184 F.3d 1339, 1350 (Fed.Cir.1999) (holding that the patentee must show that the accused device performs the identical function recited in the claim and incorporates the identical or equivalent structure disclosed in the specification and recited in the claim). In other words, in order for the relevant structure of an accused device to literally meet

a s. 112, para. 6 means-plus-function limitation, the accused structure must perform the identical function recited in the claim and must either be the same as the disclosed structure *or* be a s. 112, para. 6 "equivalent," i.e., be otherwise insubstantially different with respect to structure. *See* Kemco, 208 F.3d at 1364 (citing Odetics, 185 F.3d at 1267); Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 934 (Fed.Cir.1987) (en banc). Thus, functional identity and either structural identity or equivalence are both necessary. Caterpillar, 224 F.3d at 1379.

[27] Under a modified version of the function-way-result methodology described in Graver Tank & Manufacturing Co. v. Linde Air Products Co., 339 U.S. 605, 608, 70 S.Ct. 854, 94 L.Ed. 1097 (1950), two structures may be "equivalent" for purposes of s. 112, para. 6 if they perform the identical function, in substantially the same way, with substantially the same result. *See* Odetics, 185 F.3d at 1267 (setting forth a modified function-way-result analysis, acknowledging that "this tripartite test developed for the doctrine of equivalents is not wholly transferable to the s. 112, para. 6 statutory equivalence context" due to the functional identity requirement). Thus, two structures are only equivalent for purposes of s. 112 para. 6 when they perform the identical function, in substantially the same way, and with substantially the same result. *See* Kemco, 208 F.3d at 1364.

After comparing the language of claim 1 or claim 17 with defendant's allegedly infringing machine, the court concludes that the RZI 700 does not literally infringe the '744 patent.

Clause (e) of claim 1 as construed includes the mechanically controlled cam system above described. It is undisputed that the RZI 700 uses an electrically operated solenoid system. The accused device therefore does not contain the same structure as disclosed in the '744 patent. The key question then is whether a reasonable trier of fact could find s. 112, para. 6 equivalency between the mechanically operated cam system and the electrically operated solenoid system. In other words, do the two devices function identically and in a substantially similar structural way to achieve the substantially same result. *See* Caterpillar, 224 F.3d at 1379.

[28] After a careful review of the record and the relevant case-law, the court determines that no reasonable factfinder could find that the defendant's electrically controlled solenoid system is equivalent, for purposes of a s. 112 para. 6, to plaintiff's mechanically controlled cam system. Although the two devices appear to perform an identical function, they do so in substantially dissimilar ways.FN8 The court thus finds no literal infringement of claim 1. *See* Mas-Hamilton, 156 F.3d at 1213 (affirming district court's determination of no equivalence between a solenoid powered device and an electric stepper motor powered device since they operate in substantially different ways).

FN8. The court in reaching this conclusion has taken into consideration the Federal Circuit's recent decision in Caterpillar Inc. v. Deere & Co., 224 F.3d 1374 (Fed.Cir.2000), and contrary to plaintiff's assertions, does not believe that a finding of non-infringement, when juxtaposing the structural dissimilarities, is contrary to the holding of that case. Particularly, the court does not believe that its analysis here of the overall competing structures resorts to "an impermissible component-by-component analysis." *See, e.g.,* Deere, 224 F.3d at 1380. Rather, the court has been mindful to construe the relevant claim limitation to only include the overall structure corresponding to the claimed function. *See, e.g., id.;* Odetics, 185 F.3d at 1268.

[29] Turning to claim 17, clause (b) of that claim clearly delineates a drive mechanism connected to the frame of plaintiff's device for purposes of propelling the machine over the turf. The RZI 700 is a machine

that is coupled to a tractor. It does not contain a drive mechanism that is *connected* to the frame of the machine. Thus, there is no literal infringement.FN9 Furthermore, since the court determines that this clause is not a means-plus-function limitation, no s. 112, para. 6 equivalency analysis is necessary. FN10

FN9. Again, to find literal infringement, the accused device must include every limitation of the claim in dispute. Dolly, 16 F.3d at 397. If one limitation is missing, there can be no infringement as a matter of law. Carson Pirie Scott, 946 F.2d at 1539. Moreover, since the court fails to find infringement on the basis of this clause, it will not analyze the other clauses of this claim as above construed.

FN10. Even if this clause were construed to require a means-plus-function analysis, the court could not conclude that a reasonable trier of fact could find that the two structures here are the same or equivalent for purposes of s. 112, para. 6 given the profound structural dissimilarities between the two machines and the dissimilar ways in which they function as related to this clause.

ii. Doctrine of Equivalents

[30] If an accused device does not literally infringe, that is, is not a s. 112, para. 6 equivalent of the disclosed structure, it may nonetheless still be an "equivalent" under the doctrine of equivalents. Under the doctrine of equivalents, a device that does not literally infringe the express limitations of a patent claim may nonetheless be found to infringe if the accused device contains elements that are equivalent to each claimed element of the patented invention. *See* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 21, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997).

[31] In determining the question of equivalency with respect to mechanical devices, the Supreme Court has endorsed the use of the "function/way/result" test, which examines whether some component of the accused device (1) performs substantially the same function, (2) in substantially the same way, (3) to achieve the same result as the claimed element. *See id*. at 39-40, 117 S.Ct. 1040 (citing Graver Tank, 339 U.S. at 605, 70 S.Ct. 854); Dawn Equip. Co. v. Kentucky Farms Inc., 140 F.3d 1009, 1016 (Fed.Cir.1998).FN11

FN11. The Supreme Court has also cautioned against too broad an application of the doctrine noting its potential conflict with the "definitional and public-notice functions of the statutory claiming requirement." Warner-Jenkinson, 520 U.S. at 29, 117 S.Ct. 1040. Accordingly, courts must also take into consideration what is sometimes termed the "all elements" rule:
Each element contained in a patent claim is deemed material to defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole. It is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to effectively eliminate that element in its entirety.

Id. at 29, 117 S.Ct. 1040. *See also* Dolly, 16 F.3d at 399.
Thus, if one applies the traditional function-way-result test to establish equivalency, the accused structure must perform substantially the same function, in substantially the same way, to achieve substantially the same result, as the disclosed structure. *See* Kemco, 208 F.3d at 1364. Because the "way" and "result" prongs are the same under both s. 112 para. 6 and the doctrine of equivalents tests, a structure failing the s. 112 para. 6 test under either or both prongs must fail the doctrine of equivalents test for the same reasons.

*Id.*FN12

FN12. A key feature that distinguishes "equivalence" under s. 112, para. 6 and "equivalence" under the doctrine of equivalents is that s. 112 para. 6 equivalents must perform the identical function of the disclosed structure, while equivalents under the doctrine of equivalents need only perform a substantially similar function. *See* Kemco, 208 F.3d at 1364. The court notes that the basic inquiry under the doctrine of equivalents thus is whether the differences between the accused and disclosed structure are "insubstantial," *see* Chiuminatta, 145 F.3d at 1310, and that the function-way-result analysis is "one way to determine if substantial differences exist." Mas-Hamilton, 156 F.3d at 1212 (citing Warner-Jenkinson, 520 U.S. at 529, 117 S.Ct. 1040); *see also* Graver Tank, 339 U.S. at 609, 70 S.Ct. 854 ("[e]quivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum.").

Regarding claim 1, clause (e), since the court concluded above that there was no substantial similarity in the *way* these devices function under the s. 112, para. 6 analysis, there is no equivalency under the doctrine of equivalents. *See* Chiuminatta, 145 F.3d at 1310-11 (providing that when the "way" prong was determined to be substantially different under s. 112, para. 6 analysis, it could not infringe under the doctrine of equivalents for precisely the same reason); Kemco, 208 F.3d at 1364 (if structure fails s. 112, para. 6 test for equivalency, it "must fail the doctrine of equivalents test for the same reason(s)"). In sum, given the substantial differences between a mechanically operated cam system and the defendant's electrically operated solenoid system, no reasonable trier of fact could conclude that the RZI 700 functions in substantially the same way as that recited in clause (e) of claim 1. *See* Mas-Hamilton, 156 F.3d at 1213 (affirming no equivalency between a solenoid powered device and an electrical stepper motor powered device since the two operate in substantially different ways). Hence, there is no equivalency under the doctrine.

Turning to claim 17, clause (b), the court also determines that defendant's machine does not infringe upon plaintiff's patent under the doctrine of equivalents. Specifically, the court concludes that no reasonable factfinder could find that defendant's failure to use in the RZI 700 a drive mechanism *connected* to the machine's frame for the purpose of moving the frame in a given direction at a controlled speed manifests substantial similarity sufficient to warrant a determination of infringement under the "way" prong of the doctrine of equivalents. *See* Kemco, 208 F.3d at 1364.

Accordingly, since there is no infringement of the '744 patent, the court concludes that defendant is entitled to summary judgment of non-infringement as a matter of law.

3. The '745 Patent

Plaintiff also moves for summary judgment on the '745 patent asserting that the RZI 700 infringes it. Conversely, defendant moves for summary judgment arguing that there are clauses of claim 1 of the '745 patent that are means-plus-function clauses and that include, as a part of the corresponding structure necessary for performing the claimed functions, structure that is not found in the RZI 700.

a. Claim Construction of the '745 Patent

For purposes of this motion, the parties limit their argument to claim 1 of the '745 patent. Claim 1 reads in relevant part:

An apparatus for cultivating turf by hydraulic action, comprising:

(a) a frame;

(b) means operatively connected to said frame for propelling said apparatus over the turf to be cultivated;

(c) a plurality of fluid nozzles operatively connected to said frame, each of said nozzles having inlet and outlet ports, each of said nozzle outlet ports having a cross-sectional area and said nozzle outlet ports having a diameter of from about 0.033 to about 0.090 inch;

(d) means for pressurizing liquid operatively connected to said frame, said nozzles in fluid communication with said pressurizing means, said pressurizing means, having suitable flow on and flow off duration times, providing a flow of liquid from about 2,300 psi to about 5,500 psi;

(e) means for providing a source of liquid to be in fluid communication with said pressurizing means;

(f) means for controlling flow of the liquid from said pressurizing means to said inlet ports, whereby the liquid exits said outlet ports at a pressure sufficient to cause the liquid to penetrate the turf and create cultivation holes;

(g) a manifold having an elongate bore, said manifold having an inlet in fluid communication with said pressurizing means and said nozzles in fluid communication with said bore; and

(h) the cross-sectional area of the bore is sized in relationship to the pressure and an accumulation of the cross-sectional area of the nozzle outlet ports, wherein a water hammer effect is created which is sufficient to effect the flow of liquid out of the nozzles more in the order of a square wave pulse and the water hammer effect is not enough to destroy the manifold, wherein the relationship of the pressure in pounds per square inch, cross-sectional area of the bore (A_B) and the accumulated area of the outlet ports of the nozzles (A_N) is giving by the following: ...

In particular, clauses (b), (d), (e), (f), and (h) are in dispute. The parties concede that clauses (b), (d), (e), and (f) are means-plus-function clauses. Accordingly, the court must construe these claims in light of s. 112, para. 6.

[32] Clause (b) delineates a means for propelling the frame "operatively connected" to the frame. Therefore, the discussed function must embody the additional structure necessary to propel the frame operatively connected to the machine. After a careful review of the patent specification, the court determines that the structure disclosed that accomplishes this function includes a gasoline engine connected to a drive belt that powers a hydraulic pump that in turn provides pressurized fluid to drive a hydraulic motor that is mounted to the frame of the machine. It is clearly the combination of all of these elements that creates the source of power for propelling the frame over the turf. Moreover, as pointed out above, the word "connected" denotes "joined, linked or incapable of being separated." FN13 Thus, the "means for propelling" must include this system comprising the internal combustion engine, the hydrostatic pump and the hydraulic motor operatively connected to the frame.

FN13. *See, supra,* at 1134.

[33] Clause (d) requires a "means for pressuring liquid." The court determines that the function that this clause recites is multifaceted and includes: (1) the pressurizingof the liquid; (2) providing a suitable control of the duration-timing of the on/off flow of the liquid; and (3) controlling the flow of the liquid within a pressure range of 2,300 to 5,500 psi. The additional structure must therefore include the pump that pressurizes the liquid and the valve system that is "in fluid communication" with the nozzles. It must also include the structure for controlling the suitable flow on and flow off duration times and for providing the pressurized flow of the liquid to the nozzles that ultimately effectuates the periodic pressurized fluid injections from the output ports of the nozzles. It is this durational control of the periodic fluid injections that is essential to create the water dispersion effect that cultivates the soil. The additional structure the patent specification describes therefore includes the use of the belt-driven pump, the use of the valve, the valve seat, the reciprocating valve stem and the mechanical cam system that periodically moves the valve stem to open and close the valve thereby providing the suitable flow on and flow off times.

The parties' primary point of contention regarding this clause is whether the construction of this claim should include plaintiff's use of a cam mechanism. FN14 After a careful review of the patent specification, the court concurs with defendant's position that the means described here necessitates the inclusion of the mechanically controlled system utilizing the cam mechanism since it is structurally imperative to perform the function recited in this clause.

FN14. The court notes that for the limited purposes of opposing defendant's summary judgment motion, plaintiff concedes that this cam mechanism should be construed as part of the corresponding structure based upon the language of the claim. (*See* Pl.'s Mem.Opp.Summ.J. at 9.) Plaintiff's expert also acknowledges that this cam system should be included as part of the corresponding structure needed to perform this function. (*See* Moore Dep.P. 47, Hammer Decl.Ex. O.)

[34] Clause (e) requires a means for providing a source of liquid "to be in fluid communication" with the pressurizing means. The function recited in this clause is the transportation of the pressurized liquid from the pressuring means to the control means. The court concludes that the corresponding additional structure that the patent specification discloses to accomplish this function includes the hose system and connectors.

[35] Clause (f) calls for a means of controlling the flow of liquid. The function recited by this clause specifically calls for the control of the liquid whereby it is moved from the pressurizing means to the inlet ports of the nozzles so that it exits the outlet ports at a pressure sufficient to cause the liquid to penetrate the turf and create the cultivation. The corresponding structure disclosed in the '745 patent includes a valve and accumulator which operate in combination with an exit tube and discharge tube to produce the flow of liquid at suitable flow on and flow off times. Additionally, clause (f) must be construed to include the cam mechanism since a careful review of the patent specification indicates that the cam-actuated valve system is an indispensable part of the corresponding structure of this claim. In other words, since the cam mechanism operates the valve system that provides the necessary control of the flow which is the essential function specified by clause (f), it must be included in any construction of this claim.FN15

FN15. While clause (h) recites a "water hammer effect," considering the parties apparent disagreement over whether this claim is actually at issue in the present litigation and should even be considered in this order given the alleged concessions made by defendant in the interrogatories, and in light of the court's ultimate determination of non-infringement on the other limitations of claim 1 of this patent, the court concludes that

it need not address this clause in greater detail. (*See* Pl.'s Reply Mem.Sup.Summ.J. at 12, n. 5.)

b. Infringement of the '745 Patent

[36] Again, literal infringement of a means-plus-function limitation requires that the relevant structure in the accused device must perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification. Caterpillar, 224 F.3d at 1379; Odetics, 185 F.3d at 1267 (explaining that functional identity and either structural identity or equivalence are both necessary).FN16

FN16. As above discussed, the tests for equivalence under s. 112, para. 6 and the doctrine of equivalents are closely related, and involve "similar analyses of insubstantiality of differences." *Id*. *See also* Chiuminatta, 145 F.3d at 1311. A modified version of the well-known tripartite test for the doctrine of equivalents is applied in the s. 112, para. 6 context to determine if the differences are insubstantial, and thus an accused device is equivalent when it performs the identical function in substantially the same way to achieve substantially the same result. *See IMS Tech.,* 206 F.3d at 1435 (*citing* Odetics, 185 F.3d at 1267).

Regarding clauses (b), (d), (e) and (f), while elements of the accused device appear to perform similar functions to those recited by these clauses of claim 1 of the '745 patent, the court determines that the accused device does not contain substantially the same structure as disclosed or its equivalence since the two devices function in substantially dissimilar ways.

Clause (b) delineates a means for propelling the frame of the machine, and as construed above, this structure includes the gasoline engine, a hydrostatic pump and a hydraulic motor. It is undisputed that the RZI 700 does not contain a gasoline engine, a hydrostatic pump or a hydraulic motor.

Moreover, under a s. 112, para. 6 analysis, the court cannot conclude that the differences between the claimed and allegedly infringing structures are insubstantial. Simply put, there can be no infringement given the court's determination that the two machines function in substantially dissimilar ways. *See* Kemco, 208 F.3d at 1364. The court further does not believe, when considering this clause in the context of the invention as a whole, that a person of ordinary skill in the art would find the claimed and allegedly infringing structures to be interchangeable for purposes of performing the claimed function. *See* Caterpillar, 224 F.3d at 1380. Thus, the court concludes that defendant's device does not literally infringe clause (b) of the '745 patent.

Clause (d) requires a mechanically controlled valve system utilizing a cam mechanism. Defendant's device does not have a cam mechanism nor its equivalence.FN17 Again, and as above delineated, the court cannot conclude that these structural differences are insubstantial, nor that a person of ordinary skill in the art would find them to be interchangeable for purposes of performing the claimed function. *See id*. Clause (d) is accordingly not literally infringed by the RZI 700.

FN17. As the court has above determined, the defendant's electrically operated solenoid system is not an equivalent for purposes of s. 112, para. 6 to plaintiff's mechanical cam-actuated system. *See, supra,* at 1135. *See also* Mas-Hamilton, 156 F.3d at 1214 (holding that there was no literal infringement because "stepper motor is not the structural equivalent of [a] solenoid ...").

Lastly, clause (f) similarly calls for a valve system that includes the cam mechanism. That is, the relevant additional structure for this limitation must include the cam-actuated valve system. For the same reasons as above discussed, i.e. the RZI 700 uses an electrically controlled solenoid system not a mechanically operated cam system, the court concludes that there is no literal infringement of this clause.

In sum, when considering these means-plus-function limitations as found in clauses (d) and (f), and in the context of the invention as a whole, the court concludes that no reasonable trier of fact could find that defendant's solenoid-actuated valve system is properly considered to be an equivalent to plaintiff's mechanical cam-actuated valve system for purposes of s. 112, para. 6. *See* Mas-Hamilton, 156 F.3d at 1214 (reaching similar conclusion when comparing a solenoid powered system and a stepper motor powered system). There are more than insubstantial differences here, and the court cannot therefore conclude that defendant's device literally infringes the '745 patent.

c. Doctrine of Equivalents

Again, if an accused device is not a s. 112, para. 6 equivalent of the disclosed structure, and thus does not literally infringe, it may nonetheless still be an "equivalent" under the doctrine of equivalents and held to infringe. *See* Valmont, 983 F.2d at 1043.

The court, however, concludes that no reasonable trier of fact could find that defendant's device contains structure that is an equivalent of the disclosed structure under the doctrine of equivalents. The inordinately dissimilar ways in which the relevant structure of the two devices function clearly precludes a determination of infringement under the doctrine of equivalents. Moreover, the court cannot find the "insubstantiality of change" necessary to hold that there is infringement under the doctrine of equivalents. *See id*.

In summary, the court concludes that the RZI 700 does not infringe upon the '745 patent. Defendant is thereby entitled to summary judgment of non-infringement as a matter of law.

Accordingly, **IT IS HEREBY ORDERED** that:

1. Plaintiff's motion for summary judgment is granted in part and denied in part since the court finds infringement on the '168 patent; and

2. Defendant's motion for summary judgment is granted in part and denied in part since the court finds non-infringement on '744 and '745 patents.