IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO
**Judge Philip A. Brimmer**

Civil Action No. 06-cv-00011-PAB-MJW

BRISTOL COMPANY LIMITED PARTNERSHIP, a Nevada Limited Partnership,

Plaintiff,

v.

BOSCH REXROTH INCORPORATED, a Pennsylvania Corporation,
ROBERT BOSCH CORPORATION, a Delaware Corporation, and
BOSCH REXROTH CANADA CORP/CORPORATION BOSCH REXROTH CANADA, a Canadian Corporation,

Defendants.

---

**ORDER REGARDING CLAIM CONSTRUCTION**

---

This matter is before the Court for the construction of U.S. Patent No. 5,096,125 and U.S. Patent No. 5,186,396, both held by plaintiff Bristol Company Limited Partnership. Bristol has brought suit against defendants Bosch Rexroth Incorporated, Robert Bosch Corporation, and Bosch Rexroth Canada Corporation/Corporation Bosch Rexroth Canada (collectively, "Bosch"), charging that Bosch's devices infringe Bristol's patents. However, before the infringement issues can be addressed, I must determine what the disputed terms in the patents mean. *See, e.g.*, *Fonar Corp. v. General Electric Co.*, 107 F.3d 1543, 1550 (Fed. Cir. 1997) ("Determining whether a patent claim has been infringed requires a two-step analysis: First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device . . . ."). Claim construction is a question of law for the court. *See, e.g.*, *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc).

## I. BACKGROUND

The two Bristol patents[1] relate to vehicle-mounted devices for spreading ice- and snow-melting material on roadway surfaces. The devices provide for an integrated delivery of granular material, such as salt or sand, and liquid melting agents, such as calcium or magnesium chloride solutions. Neither the basic idea of using vehicles to dispense granular material nor the more specific synchronized delivery of granular material and liquid melting agents was new at the time of Bristol's inventions. *See* U.S. Patent No. 5,096,125 [Docket No. 124-6] ("'125 Patent") col. 1 l. 23 - col. 2 l. 24 (describing spreader vehicles and devices in existence at the time of the patent, known as "prior art"). Rather, the novelty in Bristol's devices lies in how they allow for the automatic reduction of the amount of granular material dispensed upon activation of the liquid material system and how they permit variable, dynamic control over the ratio of granular to liquid material. *See id.* col. 2 l. 28 - col. 3 l. 27 (describing the purpose of the invention). Because less granular material (often referred to as simply "granular" herein) is needed to accomplish snow and ice control when combined with a liquid melting agent, the automatic reduction function allegedly creates efficiencies by avoiding excess use of the granular. *See* 2d Am. Compl. ¶ 18. And by permitting dynamic control of the ratios, the operator of the vehicle can select the correct "mix" of

[1] Both patents were actually applied for by and issued to James Wise and John Doherty, who assigned them to Bristol shortly after issuance. *See* 2d Am. Compl. [Docket No. 66] ¶¶ 16-19. For ease of reference, I refer to Bristol throughout this Order.

granular and liquid depending on weather and road surface conditions. *See* ’125 Patent col. 3 ll. 18-22.

Bristol initially applied for what became the ’125 Patent in October 1990. *See* ’125 Patent Prosecution History, *Markman* Hearing Ex. 13 (“’125 Patent File”). In addition to describing the background of the invention, summarizing the invention, and then giving a detailed description of the invention, Bristol included 39 specific claims. *See id.*, Application at 1-36. These claims are required to “define particularly and distinctly the subject matter that the inventor regards as his or her invention”; they “set the metes and bounds of the patent owner’s exclusive rights.” Herbert F. Schwartz & Robert J. Goldman, *Patent Law and Practice* 16 (6th ed. 2008). Most of Bristol’s original claims were objected to or rejected by the U.S. Patent and Trademark Office. *See* ’125 Patent File, Feb. 22, 1991 Examiner’s Action. In response, Bristol rewrote many of the claims in “means-plus-function” form pursuant to 35 U.S.C. § 112 ¶ 6. *See id.*, Amendment at 3-5. As an alternative to drafting the claims to identify structures, i.e., specific components of a patented device, the patent laws permit certain claims to be “expressed as a means . . . for performing a specified function without the recital of structure.” 35 U.S.C. § 112 ¶ 6. So, for example, Bristol’s original claim of a component used to set the rate of liquid material delivered, i.e., a “flow control valve,” *see* ’125 Patent File, Application at 23, was redrafted as a more general means for performing that function, i.e., “means for selectively setting the liquid feed rate,” *see id.*, Amendment at 4. In addition to the rewritten claims, three new claims were added to the application. *See id.*, Amendment at 11-14. The revised application was accepted, *see id.*, Notice of Allowability, and the '125 Patent was issued on March 17, 1992.

Four claims of the '125 Patent are at issue in this lawsuit – claim 1, which was part of the original application and was rewritten in means-plus-function form, and claims 15, 16, and 17, the three newly added claims. *See* 2d Am. Compl. ¶ 23.

Claim 1 describes the following:

> In a synchronized granular and liquid spreader device mountable on a vehicle including a hydraulic system and comprising
>
> a storage hopper for containing granular material,
>
> a granular delivery system mounted on said vehicle for distributing granular material from said hopper,
>
> said hopper depositing said granular material onto conveyor means driven by said hydraulic system, said conveyor means moving the granular material to a delivery position,
>
> delivery means at said delivery position for receiving and distributing said granular material;
>
> a liquid storage tank,
>
> a liquid delivery system interconnected to said granular delivery system for supplying liquid material,
>
> means for selectively actuating said liquid delivery system for adding the liquid to the granular material generally at the delivery position; and
>
> control means for controlling the synchronous feed rate of the granular and liquid materials, the improvements in said control means comprising
>
> means for selectively setting the liquid feed rate within a range of feed rates,
>
> means for selectively setting the granular delivery system feed rate over a selected range of feed rates of granular material;

means for maintaining a predetermined ratio of the feed rate of liquid material to the feed rate of granular material and

means operative in response to actuation of said liquid delivery system for reducing by a variably selected percentage the quantity of granular material delivered by said granular material delivery system while maintaining said predetermined ratio of the feed rates of delivery of liquid material and granular material.

’125 Patent col. 10 l. 45 - col. 11 l. 6.

Claim 15 describes:

In an apparatus for the synchronized spreading of granular and liquid materials onto a surface and comprising

a granular material delivery system including

a hopper for containing granular material,

a spreader for distributing the granular material onto a surface,

a conveyor for conveying the granular material from said hopper to said granular material spreader,

a liquid material delivery system including

a tank for containing liquid material,

a spreader for distributing the liquid material onto said surface,

a pump for pumping liquid material from said tank to said liquid material spreader,

first means for driving said conveyor,

second means for driving said pump, and

means for controlling said first means and said second means, the improvement in said controlling means comprising

means for controlling said first means and thereby the quantity per surface area of granular material to be applied to the surface,

> means for controlling said second means and thereby the amount of liquid per surface area applied to the surface as a function of the amount of granular material being applied to the surface and a selected ratio of liquid material to granular material, and
>
> means for variably controlling said first means in response to the activation of said second means, for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second means.

*Id.* col. 13 ll. 1-27.

Claim 16 describes:

> In an apparatus for the synchronized spreading of granular and liquid materials onto a surface and comprising
>
> a granular material delivery system including
>
> a hopper for containing granular material,
>
> a spreader for distributing the granular material onto a surface,
>
> a conveyor for conveying the granular material from said hopper to said granular material spreader,
>
> a liquid material delivery system including
>
> a tank for containing liquid material,
>
> a spreader for distributing the liquid material onto said surface,
>
> a pump for pumping liquid material from said tank to said liquid material spreader,
>
> a first motor for driving said conveyor,
>
> a second motor for driving said pump, and
>
> means for controlling said first and second motors, the improvement in said controlling means comprising
>
> means for controlling said first motor as a function of a predetermined amount of granular material to be applied to the surface,

means for adjustably controlling said second motor as a function of the amount of granular material to be applied to the surface and a selected ratio of liquid material to granular material, and

means for variably controlling said first motor in response to the activation of said second motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second motor.

*Id.* col. 13 l. 28 - col. 14 l. 11.

And claim 17 describes:

In an apparatus for the synchronized spreading of granular and liquid materials onto a surface and comprising

a granular material delivery system including

a hopper for containing granular material,

a spreader for distributing the granular material onto a surface,

a conveyor for conveying the granular material from said hopper to said granular material spreader,

a liquid material delivery system including

a tank for containing liquid material,

a spreader for distributing the liquid material onto said surface,

a pump for pumping liquid material from said tank to said liquid material spreader,

a first fluid pressure motor for driving said conveyor,

a second fluid pressure motor for driving said pump,

a pressure fluid pump for delivering pressure fluid to said first and second fluid pressure motors, and

means for controlling the flow of pressure fluid to said first and second fluid pressure motors, the improvement in said controlling means comprising

> means for proportioning the flow of pressure fluid to said first and second fluid pressure motors as a function of a selected amount of granular material to be applied to the surface and a selected ratio of granular material to liquid material to be applied to the surface, and
>
> means for variably controlling said first fluid pressure motor in response to the activation of said second fluid pressure motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second fluid pressure motor.

*Id.* col. 14 ll. 12-41.

Shortly before the ’125 Patent issued, Bristol filed a “continuation-in-part” or “CIP” application that eventually became patent number 5,186,396 (“’396 Patent”). This application contained the same basic material as the ’125 Patent, along with certain new claims. *See, e.g.*, *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1304 n.3 (Fed. Cir. 2008) (noting that a CIP application contains “a portion or all of the disclosure of an earlier application together with added matter not present in that earlier application”). The new material involved the use of computers to accomplish the variable reduction function described in the ’125 Patent. *See* ’396 Patent [Docket No. 124-8] Figs. 11-12c; *see also id.* col. 1 l. 58 - col. 2 l. 61, col. 9 l. 63 - col. 11 l. 11. Only claim 3 of the ’396 Patent is involved in the current litigation. *See* 2d Am. Compl. ¶ 23. That claim describes the following:

> A spreader for granular and liquid materials comprising
>
> a vehicle including
>
> a hydraulic system,
>
> a storage hopper mounted on said vehicle for containing granular material,
>
> a ground speed computer including

means for sensing vehicle speed and generating a vehicle speed signal,

a granular material delivery apparatus including

a conveyor controlled by said ground speed computer and driven by said hydraulic system for moving the granular material from the hopper to a delivery position and

means at said delivery position for receiving and distributing said granular material onto a roadway surface,

said ground speed computer including

means for controlling said granular material delivery apparatus,

means for sensing conveyor speed and generating a conveyor speed signal,

a liquid material storage tank mounted on said vehicle, and

a liquid material delivery apparatus including

a conduit for supplying liquid material from said tank to a delivery position and

means at said delivery position for distributing said liquid material

wherein the improvement comprises

a material computer for controlling the feed rates, [sic] of the granular and liquid materials,

said material computer including mean [sic] for receiving said vehicle speed signal and generating a first signal as a function of said sensed vehicle speed,

said material computer including means for receiving said conveyor speed signal and generating a second signal as a function of said sensed conveyor speed,

said material computer including means for directing said first signal to said ground speed computer for controlling the delivery of said granular material,

> said material computer including means for directing said second signal to said liquid material delivery, [sic] apparatus for controlling the delivery of liquid material thereby,
>
> said material computer including means for selectively setting the liquid material feed rate within a selected range of feed rates,
>
> said material computer including means for selectively setting the granular material feed rate within a selected range of feed rates,
>
> said material computer including means for maintaining a predetermined ratio of said feed rate of liquid material to said feed rate of granular material, and
>
> said material computer including means responsive to actuation of said liquid material delivery apparatus for reducing by a variably selected percentage the quantity of granular material delivered by said granular material delivery apparatus while maintaining said predetermined ratio of the feed rates of delivery of liquid and granular materials.

’396 Patent col. 12 l. 43 - col. 14 l. 7.

Bristol filed its original complaint on January 4, 2006. Compl. [Docket No. 1]. Both this complaint and the first amended complaint, filed several weeks later, asserted infringement of the ’396 Patent only. *See id.* ¶ 14; *see also* Am. Compl. [Docket No. 24] ¶ 14. However, in the operative second amended complaint, filed in June 2006, Bristol alleged infringement of both patents. *See* 2d Am. Compl. ¶ 12. The patent claim construction issues were briefed and a *Markman* hearing[2] was held in the summer of 2007. *See* Joint Claim Construction Statement [Docket No. 107]; Plaintiff’s Claim Construction Brief [Docket No. 118] (“Bristol Br.”); Defendants’ Claim

---

[2] In *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996), the Supreme Court determined that claim construction is an issue of law for the court to resolve after considering evidence and argument regarding the proper interpretation of the patent claims. As a result, many courts, including the court in this case, hold so-called “*Markman* hearings” to address construction.

Interpretation Brief [Docket No. 124] ("Bosch Br."); Plaintiff Bristol Company, LP's Brief In Reply to Defendant Bosch's Response on Claim Construction [Docket No. 135] ("Bristol Reply"); *Markman* Hearing Transcript of Proceedings [Docket No. 141] ("*Markman* Trans."). Following several reassignments and recusals, this case was assigned to me with the claim construction issues still outstanding and all other matters, such as dispositive motions and trial setting, stayed pending the outcome of that construction. I now take up the construction of the disputed terms in the relevant claims, relying on the briefs, exhibits, and testimony of the parties and their experts as set forth during the *Markman* hearing.

## II. LEGAL STANDARDS FOR PATENT CLAIM CONSTRUCTION

In construing patent claims, courts are guided by the precedent of the Federal Circuit. *See SunTiger, Inc. v. Scientific Research Funding Group*, 189 F.3d 1327, 1333 (Fed. Cir. 1999). As that court has explained, "there is no magic formula or catechism for conducting claim construction." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed. Cir. 2005) (en banc). Even so, the *Phillips* decision outlined several key sources and doctrines that ought to be consulted and applied, all the while making clear that "[t]he sequence of steps used by the judge in consulting various sources is not important; what matters is for the court to attach the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law." *Id.*

Courts begin with the "bedrock principle" that "'the claims of the patent define the invention to which the patentee is entitled the right to exclude.'" *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115

(Fed. Cir. 2004)). The words of the claims "'are generally given their ordinary and customary meaning,'" *id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)), which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention," *id.* at 1313. Sometimes, when the claim language "involves little more than the application of the widely accepted meaning of commonly understood words," construction is relatively straightforward and "the ordinary meaning . . . may be readily apparent even to lay judges." *Id.* at 1314. However, when the claim terms have a particular meaning in the field, courts "look[ ] to 'those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean.'" *Id.* (quoting *Innova*, 381 F.3d at 1116). These sources include "'the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.'" *Id.*

Importantly, claim terms are not read in a vacuum. *Id.* at 1313. The context in which a term is used, both in the asserted claim as well as in other claims of the patent, can be valuable and instructive. *Id.* at 1314. In addition, the patent specification – the text and figures of the patent that precede the claims – "'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582). Courts also consider the patent's prosecution history – the official record of the patent application and subsequent process before the U.S. Patent and Trademark Office. *Id.*

at 1317. That history "provides evidence of how the PTO and the inventor understood the patent." *Id.* However, "because the prosecution history represents an ongoing negotiation between the PTO and the applicant, . . . it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.*

Courts may consult extrinsic evidence such as "expert and inventor testimony, dictionaries, and learned treatises." *Id.* However, this evidence is "'less significant than the intrinsic record,'" i.e., the specification and prosecution history, *id.* (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)), and courts must be wary not to use extrinsic evidence to override the meaning of the claim terms demonstrated by the intrinsic evidence. *Id.* at 1318-19. That is, "extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Id.* at 1319.

In sum, a court's basic role is to construe the claim terms as they would be viewed by "the ordinary artisan after reading the entire patent." *Id.* at 1321. This is crucial in order to respect the public notice function of patents:

> The patent system is based on the proposition that claims cover only the invented subject matter. As the Supreme Court has stated, "[i]t seems to us that nothing can be more just and fair, both to the patentee and the public, than that the former should understand, and correctly describe, just what he has invented, and for what he claims a patent."

*Id.* at 1321 (quoting *Merrill v. Yeomans*, 94 U.S. 568, 573-74 (1876)).

Where claims are written as "means-plus-function" limitations, as are many claims here, additional nuance applies to their construction. As noted above, § 112 ¶ 6 permits a patentee to claim a means to accomplish a function, rather than a specific structure, when describing an invention. Construction of a means-plus-function claim is a two-step process. First, the court identifies the function described in the claim language, applying ordinary principles of claim construction to do so. *See, e.g.*, *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 296 F.3d 1106, 1113-14 (Fed. Cir. 2002). Next, the court looks to the specification to determine what, if any, structure is disclosed to perform that claimed function. *See, e.g.*, *id.* A patentee does not receive protection over an indefinite number of structures or devices that *could* perform the claimed function. Instead,

> in return for generic claiming ability, the applicant must indicate in the specification what structure constitutes the means. "If the specification is not clear as to the structure that the patentee intends to correspond to the claimed function, then the patentee has not paid the price but is rather attempting to claim in functional terms unbounded by any reference to structure in the specification."

*Biomedino, LLC v. Waters Technologies Corp.*, 490 F.3d 946, 948 (Fed Cir. 2007) (quoting *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003)). This is not an onerous burden. *See, e.g.*, *Atmel Corp. v. Information Storage Devices, Inc.*, 198 F.3d 1374, 1382 (Fed. Cir. 1999) ("All one needs to do in order to obtain the benefit of that claiming device is to recite some structure corresponding to the means in the specification, as the statute states, so that one can readily ascertain what the claim means . . . ."). But neither does this requirement permit generic references or unfocused language. In order to properly indicate that structure corresponds to function, the specification or prosecution history must "clearly link[ ] or associate[ ] that structure to the function recited in the claim." *Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005). "This duty to link or associate structure to function is the *quid pro quo* for the convenience of employing § 112 ¶ 6." *Id.*

As with all patents, a court must read the specification from the perspective of one skilled in the art. However, the relevant inquiry is not whether such a person could *implement* a structure by reading the specification, but rather "whether one of skill in the art would understand the specification itself to *disclose* the structure." *Elekta*, 344 F.3d at 1212 (emphasis added); *see also Atmel*, 198 F.3d at 1380 (noting that "the understanding of one skilled in the art in no way relieves the patentee of adequately disclosing sufficient structure in the specification"). In other words, while the patent covers all disclosed structures, "including any alternative structures identified," *Serrano v. Telular Corp.*, 111 F.3d 1578, 1583 (Fed Cir. 1997), the key is that the structures are actually "disclosed" and "identified." A patentee may not simply state that structures may be used without specifically describing them. *See, e.g.*, *Fonar*, 107 F.3d at 1551-52 ("The '966 specification discloses use of a generic gradient wave form. Although it states that other wave forms may be used, it fails to specifically identify those wave forms. Thus, under section 112, ¶ 6, claim 12 is limited to use of a generic gradient wave form and its equivalents.").

In this way, the rules of construction serve to narrow an otherwise unbounded functional claim. *See, e.g.*, *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1479 (Fed. Cir. 1998) ("[C]laims written in the means-for form of § 112 ¶ 6 do not, by virtue of this form, acquire a scope as to the function beyond that which is supported in the specification, or as to the structure beyond equivalents of that shown in the specification."); *Jonsson v. Stanley Works*, 903 F.2d 812, 819 (Fed. Cir. 1990) ("Paragraph 6 'operates to *cut back* on the type of *means* which could literally satisfy the claim language.'" (quoting *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 (Fed. Cir. 1989))) (emphasis in original). "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." *Kahn v. General Motors Corp.*, 135 F.3d 1472, 1476 (Fed. Cir. 1998). These principles exist to ensure that the public clearly understands what the patent covers. As the Federal Circuit has aptly explained,

> [t]he public should not be required to guess as to the structure for which the patentee enjoys the right to exclude. The public instead is entitled to know precisely what kind of structure the patentee has selected for the claimed functions, when claims are written according to section 112, paragraph 6. . . . Such rules are intended to produce certainty in result. Precision in claiming is not an unreasonable price to pay to gain the benefits of claiming in functional terms under section 112, paragraph 6.

*Elekta*, 344 F.3d at 1219-20.

One final point before turning to the claims at issue. Both parties invoke "equivalents" in their claim construction arguments, sparring over whether Bosch's products are equivalent to structures in Bristol's patents. In the context of means-plus-function claims, there are two situations in which equivalence may be an issue. First, by the terms of § 112 ¶ 6 itself, a product *literally* infringes a patent where it is equivalent to the disclosed structure. *See, e.g.*, *WMS Gaming Inc. v. Int'l Game Technology*, 184 F.3d 1339, 1347 (Fed. Cir. 1999). Moreover, under the *doctrine of* *equivalents*, a claim may be infringed "if the differences between the claim and the accused device are insubstantial." *Id.* at 1352. However, neither of these equivalence issues is relevant at this stage of the litigation. Unlike claim construction, which is a question of law for the Court, equivalence is a question of fact best reserved for summary judgment or trial. *See, e.g.*, *Wavetronix LLC v. EIS Electronic Integrated Systems*, 573 F.3d 1343, 1360 (Fed. Cir. 2009) ("As with literal infringement, infringement by equivalents is a question of fact."). Determining infringement at the construction stage, which necessarily requires a comparison with the allegedly infringing product, would run afoul of the Federal Circuit's repeated caution that "'claims may not be construed by reference to the accused device.'" *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1330-31 (Fed. Cir. 2006) (quoting *NeoMagic Corp. v. Trident Microsystems, Inc.*, 287 F.3d 1062, 1074 (Fed. Cir. 2002)). In short, issues of equivalence are not before me at this time.

## III. ANALYSIS

Bristol asserts that Bosch's products infringe four claims of the '125 Patent and one claim of the '396 Patent. I first address the claims of the '125 Patent.

### A. Claim 1 of the '125 Patent

The parties' dispute over claim 1 focuses on two key issues: what the patent means when it describes the "connection" between the granular and liquid material systems, and what structures are identified as part of the "control means" for controlling those two systems.

### *1. Connection between liquid and granular systems*

Claim 1 describes, among other things, "a liquid delivery system interconnected to [the] granular delivery system for supplying liquid material." '125 Patent col. 10 ll. 55-57. Bristol contends that the term "interconnected" includes a liquid delivery system that is connected "electronically, hydraulically, or mechanically" to the granular system. Bosch claims the connection must be hydraulic.

In support of Bristol's argued construction, it notes that the summary section of the patent expressly uses this "electronic, hydraulic, or mechanical" language. Bristol Br. at 16-17; *see also* '125 Patent col. 2 ll. 60-62 ("The liquid delivery system is mechanically, electronically or hydraulically connected to the granular delivery system."). Bristol also points out that the preferred embodiments include both mechanical and hydraulic connections, making clear that the connection is not limited to hydraulics. Bristol Br. at 17; *see also* '125 Patent col. 4 ll. 58-65 ("The liquid pump 40 of the liquid delivery system 25 is mechanically connected through a gear box 46 to a shaft of the conveyor 20 in a mechanical embodiment. (FIG. 3). In the hydraulic embodiments of FIGS. 5 through 10, the pump 40 is mechanically connected to the liquid system motor 38, which is in fluid communication with the hydraulic system 28 of the granular delivery system 23."). Thus, Bristol contends, "interconnected" should be read to include all three connection types.

Bosch, on the other hand, dismisses what it calls a "passing statement" to electronic, hydraulic, and mechanical connection and argues that the embodiments and descriptions in the patent for performing the functions of reducing the feed rate of the granular system or selecting a ratio of liquid to granular material are all hydraulic. Bosch Br. at 11-12. Bosch relies on the following language in the patent specification:

> In all of the embodiments discussed, reduction of the feed rate of the granular delivery system 23 resulted from diversion of hydraulic fluid to the liquid delivery system 25. It is also contemplated in the embodiment shown in FIG. 10 of the present invention to reduce the feed rate of the granular delivery system 23 by diverting hydraulic fluid from the conveyor motor 26 in a proportional amount and returning the hydraulic fluid to the reservoir 34 rather than to the liquid delivery system 25.

’125 Patent col. 9 ll. 42-50.

I adopt Bristol’s construction. In determining the meaning of a claim term, I read the term “in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313. The specification is “the single best guide to the meaning of a disputed term.” *Id.* at 1315 (quotations and citation omitted)); *see also Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (“The specification contains a written description of the invention that must enable one of ordinary skill in the art to make and use the invention. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims.”). Here, the specification could not be clearer: “The liquid delivery system is mechanically, electronically or hydraulically connected to the granular delivery system.” ’125 Patent col. 2 ll. 60-62.

Bosch’s attempt to look to the specific embodiments to override this clear language is improper. As an initial mater, it is not clear that the portion of the specification relied on by Bosch deals with the general *connection* between the systems. Rather, it appears to bear on the manner in which the specific *reduction in* *feed rate* is accomplished. But even assuming the language deals with the connection issue, restricting the meaning of a claim term to that described in an embodiment constitutes what the Federal Circuit has called "one of the cardinal sins of patent law – reading a limitation from the written description into the claims." *SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, 242 F.3d 1337, 1340 (Fed. Cir. 2001); *see also SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875 (Fed Cir. 2004) ("Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment."). This claim element is not written in means-plus-function format, requiring some link between the claim term and a specific structure. Rather, the question is simply what the word "interconnected" means in the context of the entire patent. As the specification provides a clear definition, that is the definition I must apply.

#### *2. Control means*

Claim 1 also describes a

> control means for controlling the synchronous feed rate of the granular and liquid materials, the improvements in said control means comprising
>
> [(1)] means for selectively setting the liquid feed rate within a range of feed rates,
>
> [(2)] means for selectively setting the granular delivery system feed rate over a selected range of feed rates of granular material;

> [(3)] means for maintaining a predetermined ratio of the feed rate of liquid material to the feed rate of granular material and
>
> [(4)] means operative in response to actuation of said liquid delivery system for reducing by a variably selected percentage the quantity of granular material delivered by said granular material delivery system while maintaining said predetermined ratio of the feed rates of delivery of liquid material and granular material.

’125 Patent col. 10 l. 60 - col. 11 l. 6. The parties dispute the meaning of each of the four “means” clauses constituting the control means. However, before turning to the construction of these clauses, I address a threshold issue. As discussed in detail below, many of the structures in the patent consist of specific valves through which fluid or liquid pass. The parties disagree about precisely what types of valves are described in the patent.

**a. Valve definition**

Bosch argues that the patent discloses only three types of valves: a “direction control valve” that sends all of its flow in one direction or another; a “flow control valve” that divides the flow proportionally between two different destinations, and a “liquid flow control valve” that regulates the flow of liquid material to the liquid nozzles. Bosch Br. at 14-15. Bristol does not contest Bosch’s description of the liquid flow control valve. *Compare* Bosch Claim Construction Chart [Docket 124-3] (“Bosch Claim Chart”) at 2 (“[A] ‘Liquid Flow Control Valve’ is a valve which limits the flow of the liquid material to the liquid nozzles. It is not a hydraulic valve.”); *with* Bristol Reply at 42 (“It should be noted that there are also liquid flow control valves. This is not a hydraulic fluid valve, but rather a valve which controls the amount of flow of the calcium chloride or magnesium chloride being applied to the granular material.”). However, Bristol contends that Bosch's definition of the other two valves is overly limited. Bristol asserts that "direction" or "directional" valves and "variable flow" valves are general terms familiar to persons of ordinary skill in the art and that they include more than just the *two-position* direction valve or the *flow divider* flow control valve referenced by Bosch. Bristol Reply at 37-41.

Bristol is correct that, in the hydraulics literature, direction valves and flow control valves encompass a broad array of devices. For example, direction valves are described as "manag[ing] the flow path of the fluid in the system. They function to stop, start, check, divert, shuttle, divide proportionally, and by other means direct the flow of oil in one, two, three, four, or more flow paths or ways." Sullivan, J., *Fluid Power: Theory and Applications* 230 (4th ed. 1998); *see also id.* (noting that "[o]ne-way, two-way, three-way, and four-way valves are common").[3] As Bosch's own expert, Dr. Michael Sidman, admits, this definition encompasses more than the two-position valve described by Bosch. *See* Bristol Reply, Ex. E (noting that "[o]utside of the restrictive meaning used in the '125 patent, 'Directional control valves'" have the broader meaning described in the Sullivan text). Similarly, Bristol points to industry literature that shows "flow divider" valves to be just one of many types of flow control valves. Bristol Reply at 39-40 (citing Penton Publishing Company's website, at

---

[3] The Sullivan text expressly refers to "direction*al*" valves. Bosch attempts to draw a distinction between "direction" valves and "directional" valves, arguing that "nowhere in the '125 Patent does the term 'direction' have the all-important '-al' attached to it." Bosch Br. at 18. That is not correct. Although Bristol most commonly invokes the term "direction," it uses the two terms interchangeably. *See, e.g.*, '125 Patent col. 7 ll. 44-48, col 8 ll. 32-34 (describing valve 72 as a "directional" valve); *id.* col. 8 ll. 2-3, 29-32 (describing the same valve 72 as a "direction" valve).

http://www.hydraulicspneumatics.com). The question is whether these general definitions apply in this case.

Bristol relies on the uncontroversial principle that "[g]enerally speaking, [courts] indulge a 'heavy presumption' that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). However, "direction" and "flow control" are not *claim* terms; rather, they are used in the specification to describe *structures* that correlate to the "means-plus-function" limitations at issue. Bristol points to no case suggesting that the "ordinary meaning" canon applies to evaluating *structures*. Indeed, the opposite is normally true. In the face of a means-plus-function limitation, structures must be clearly disclosed, a requirement "intended to produce certainty in result." *Elekta,* 344 F.3d at 1220; *see also id.* (noting that means-plus-function patents require "[p]recision in claiming").

Moreover, even if the "ordinary meaning" canon applied to interpretation of terms used in the specification, courts must "adopt a definition that is different from the ordinary meaning when 'the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.'" *Edward Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009) (quoting *CCS Fitness*, 288 F.3d at 1366). Thus, a patentee's repeated and exclusive use of a term to mean only one thing will limit that term accordingly. *See id.* (noting that because the only devices described in the specification were "intraluminal" graft devices, the claim term "graft" meant "intraluminal graft").

In light of these principles, I agree with Bosch that the direction and flow control valves described in the patent have specific, limited meanings. Direction control valves are repeatedly described as functioning as "on-off" switches, directing all flow to either one output or another:

> [U]sing a hydraulic direction control valve 60, the granular material delivery system 2 selectively diverts all of the hydraulic flow away from the hydraulic system 28 to the liquid system motor 38 of the liquid delivery system 25. . . . In the first setting of the direction control valve 60, the liquid delivery system 25 is activated or on. In the second setting of the valve 60, only the operation of the separate conveyor motor 26 is selected. In that case, the liquid delivery system 25 is off.

'125 Patent col. 6 ll. 33-46.

> If the liquid delivery system 25 is on, i.e., motor 38 is activated by setting the direction control valve 60, then the pump 40 operates as previously described . . . . A liquid level indicator 62 can be mounted in the liquid tank 16 selecting the first setting, to turn off the liquid delivery system 25 at the direction control valve 60 . . . .

*Id.* col. 6 ll. 55-63.

> In the embodiment shown in FIG. 7 the hydraulic direction control valve 50 is utilized in a first setting to solely direct fluid to the separate conveyor motor 26 or, through the hydraulic flow control valve 48, in a second setting directs fluid to the liquid system motor 38 and the conveyor motor 26. As has been discussed in other embodiments, if the separate conveyor motor 26 is selected by the direction control valve 50, the liquid delivery system 25 is shut off.

Id. col. 6 l. 64 - col. 7 l. 4.

> The level indicator 62 operates the direction control valve 50 to enable or disable the liquid delivery system 25, depending upon the level of liquid 17 in the tank 16.

*Id.* col. 7 ll. 25-28.

> As before, depending on the position of the direction flow control valve 72, the liquid delivery system 25 is either on or off. If the flow control valve 72 is set to turn the liquid delivery system 25 off, then all the hydraulic fluid is

> directed toward the conveyor motor 26 of the granular delivery system 23. If the direction flow control valve 72 is on, then the hydraulic fluid is directed through the first variable flow control valve 70 . . . .

*Id.* col. 8 ll. 4-11.

> The direction control valve 80 can be electronically connected as described previously to activate or deactivate the liquid delivery system 25. If the direction control valve 80 is set to direct fluid to the conveyor motor 26 only, no reduction in hydraulic flow, and, therefore, no reduction in granular material feed rate occurs nor is liquid added.

*Id.* col. 9 l. 65 - col. 10 l. 3.

Similarly, hydraulic flow control valves are consistently described as valves that divide flow between two outputs, sending X% of their flow to one output and 100 - X% to another:

> If the flow control valve 48 is selected by the direction control valve 50, a selected constant percentage of the hydraulic fluid is available to operate the liquid system motor 38, with the balance operating the separate conveyor motor 26.

*Id.* col. 7 ll. 4-8.

> In the embodiment shown in FIG. 8, a desired percentage of hydraulic fluid is diverted at the variable flow control valve 48 from hydraulic system 28 to the liquid delivery system 25.

*Id.* col. 7 ll. 29-32.

> If the direction flow control valve 72 is on, then the hydraulic fluid is directed through the first variable flow control valve 70, which sets the percentage of reduction as has been discussed with respect to FIGS. 7 and 8. A percentage of hydraulic fluid is diverted to the liquid delivery system 25, and the remainder is used to drive the granular delivery system 23. Hydraulic fluid then passes through the second variable flow control valve 74. . . . Depending on the setting of the second variable flow control valve 74, the liquid delivery system 25 operates at a full feed rate for the liquid 17 or at a lesser feed rate. . . . As in the alter [sic] embodiments, the liquid feed rate is constant within a range. As seen in FIG. 9, any excess hydraulic fluid is returned to the hydraulic system 28 and eventually to the reservoir 34.

*Id.* col. 8 ll. 9-28.

> It is also contemplated in the embodiment shown in FIG. 10 of the present invention to reduce the feed rate of the granular delivery system 23 by diverting hydraulic fluid from the conveyor motor 26 in a proportional amount and returning the hydraulic fluid to the reservoir 34 rather than to the liquid delivery system 25. Such a diversion is accomplished by a variable flow control valve 82 and a direction control valve 80 similar to valves 48 and 50 described in reference to the embodiment shown in FIG. 7. The variable flow control valve 82 is placed in line so as to be upstream from the conveyor motor 26. A proportional amount of hydraulic fluid is thus directed to the liquid and conveyor motors 38 and 26 and the remaining and proportional amount of hydraulic fluid in the hydraulic system 28 is returned to the reservoir 3 by the variable flow control valve 82.
>
> To achieve the desired reduction of the granular material feed rate, the variable flow control valve 82 returns the remaining proportional amount of the hydraulic fluid to the reservoir 34.

*Id.* col. 9 ll. 45-65.

In short, the ’125 Patent describes “direction” (or “directional”) and “flow control” valves in specific and distinct ways. These descriptions must control over a broad interpretation of what the terms direction and flow control valve *could* mean. *Cf. Elekta*, 344 F.3d at 1220 (Fed. Cir. 2003) (“The public . . . is entitled to know precisely what kind of structure the patentee has selected for the claimed functions, when claims are written according to section 112, paragraph 6.”). I therefore adopt Bosch’s construction; direction control valves, as that term is used in the patent, send all of the flow in one direction or another, and flow control valves divide the flow between two different destinations.

Bristol also contends that direction and flow control valves can be combined into one valve serving both functions. Bristol Reply at 42. As a matter of basic engineering, that may be true. However, Bristol does not cite, nor have I found, any language in the patent that discloses such a combined structure. Thus, for purposes of construing what the patent terms mean – which is my task at this stage of the proceeding – I cannot include a single valve that controls both direction and flow.

Further, both parties occasionally dispute whether certain valves are equivalent to the direction and flow control valves described in the ’125 Patent. *See, e.g.*, Bosch Br. at 18 (contending that a valve it uses, the MP-18 valve, is not an equivalent structure to either a direction control valve or a variable control valve); Bristol Reply at 42 (contending that the MP-18 valve is “[a]t the least” an equivalent to the valves described). But as discussed above, the factual question of equivalents is a separate inquiry from the legal question of claim construction, and is not appropriate to consider at this time. I express no opinion as to whether other “directional” or “flow control” valves referenced in the industry literature, a combined direction and flow valve, the MP-18 valve, or any other valve or structure is equivalent to the specific valves described in the ’125 Patent.

In addition to disputing the type of valves used, Bristol contends that the manner of control of those valves – and specifically electronic control – is disclosed in the patent. Bristol Br. at 5, 13; *see also* Bristol Reply Br. at 42-44. However, unlike the repeated and consistent description of the type of valve (direction and flow control), there is no general description of how those valves are actuated or controlled. Bristol’s references to electronic valve control in the patent all deal with specific valves performing specific functions. *See* Bristol Reply at 43 (referencing col. 9 ll. 34-38 (“[T]he liquid feed rate could be measured electronically, and a signal proportional to the feed rate would proportionately open and close a valve (not shown) in the hydraulic system 28."); col. 9 ll. 65-68 ("The direction control valve 80 can be electronically connected as described previously to activate or deactivate the liquid delivery system 25.")). Bristol's other references to electronics in the patent touch on other issues, not valve control. *See* Bristol Reply at 43-44 (referencing col. 2 ll. 60-62 ("The liquid delivery system is mechanically, electronically or hydraulically connected to the granular delivery system."); col. 4 ll. 26-29 ("If the hydraulic system 28 is turned off at the switch 33, hydraulic fluid is returned to a fluid reservoir 34, through by-pass line 30."); col. 9 ll. 31-34 ("Those of ordinary skill in the art will appreciate that reduction, or proportional change, of the feed rate of the granular delivery system 23 may result from other mechanical and electronic means.")). Basic control of the valves is not a relevant aspect of the patented devices. For that reason, I decline to construe the patent to require any type of basic valve actuation or control. Instead, I address the control of specific valves as those issues arise.[4]

With this background in mind, I turn to the four "means" clauses of claim 1.

**b. Means for selectively setting the liquid feed rate**

The first clause at issue is the "[m]eans for selectively setting the liquid feed rate within a range of feed rates." '125 Patent col. 10 ll. 62-64. The parties agree that the claimed function is the setting of the rate, from a number of available rates, at which the

[4] This does not necessarily mean that a structure using electronically controlled valves might not infringe the patent. As a matter of basic mechanics, the valves must be controlled – open, shut, or adjusted – by some means or other. *See* Bristol Reply at 42. Rather, the point is that the patent is generally silent as to how that control is to occur, and thus basic valve control is not an element of the patent claims. As Bristol rightly observes, it did not invent a valve, but instead invented a way to combine valves to achieve variable reduction and system synchronization. *See* Bristol Br. at 14.

liquid material is to be spread. Joint Claim Construction Statement, ’125 Patent Claim 1 [Docket No. 107-3] (“’125 Patent Claim 1 Chart”) at 7. The parties’ dispute centers on what structure or structures correspond with this function.

First, the specification discloses the use of an adjustable liquid flow control valve positioned in the liquid material flow path. This valve sends some portion of the liquid material to the nozzles that spread the material and the remaining portion of the liquid material back to the liquid storage tank. By adjusting this liquid flow control valve, the amount of liquid material to be spread – the feed rate – can be manipulated. *See, e.g.*, ’125 Patent col. 2 ll. 66-68 (“The liquid feed rate may be changed by a flow control valve, which returns a selected portion of the liquid to the storage tank.”); *id.* col. 6 ll. 22-26 (“[A]djustment of the flow control valve 42 determines how much of the liquid 17 is applied to the nozzles 21 and how much is returned to the tank 16. The flow control valve 42 therefore determines the amount of liquid 17 applied to the road 18 . . . .”). This structure is clearly associated with the function of setting the liquid material feed rate.

The specification also describes a two-stage adjustment to the liquid material feed rate, using the liquid motor and liquid pump in connection with an adjustable liquid flow control valve. This structure is illustrated in Figure 7 of the ’125 Patent:

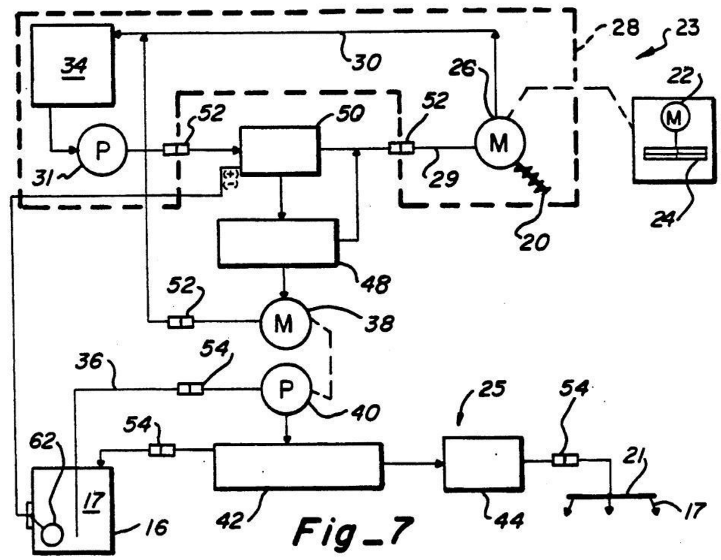


Fig_7

At the first stage, the speed of the liquid motor [38] and therefore the liquid pump [40] is adjusted by manipulating how much hydraulic fluid – and therefore power – is sent to the motor. This adjustment is accomplished by means of a variable flow control valve [48] that divides the hydraulic fluid between the liquid motor [38] and the conveyor motor [26], i.e., the motor that powers the granular material distribution. Changing the amount of hydraulic fluid increases or decreases the speed of the motor and pump, thereby adjusting the speed at which liquid is pumped through the liquid system. At the second stage, the amount of liquid being pumped through the system is further reduced by use of the same type of liquid flow control valve [42] discussed above. The entire process is described in the specification:

> If the flow control valve 48 is selected by the direction control valve 50, a selected constant percentage of the hydraulic fluid is available to operate the liquid system motor 38, with the balance operating the separate [granular] conveyor motor 26.

> . . . . The percent of fluid diverted to the motor 38 is set at a constant but may be changed to any of an infinite number of settings over a range by the operator, altering the feed rate of the granular delivery system 23. . . .
>
> As before, the liquid system motor 38 mechanically drives the pump 40, the liquid 17 is forced through the variable flow control valve 42 and the flow meter 44 to the nozzles 21.

'125 Patent col. 7 ll. 4-25. This two-stage process, using both the speed of the motor and pump and the liquid flow control valve, also clearly accomplishes the function of setting the liquid material feed rate.[5]

Finally, the specification discloses a structure that uses two adjustable flow control valves placed in the hydraulic fluid flow path. This structure is illustrated in Figure 9:

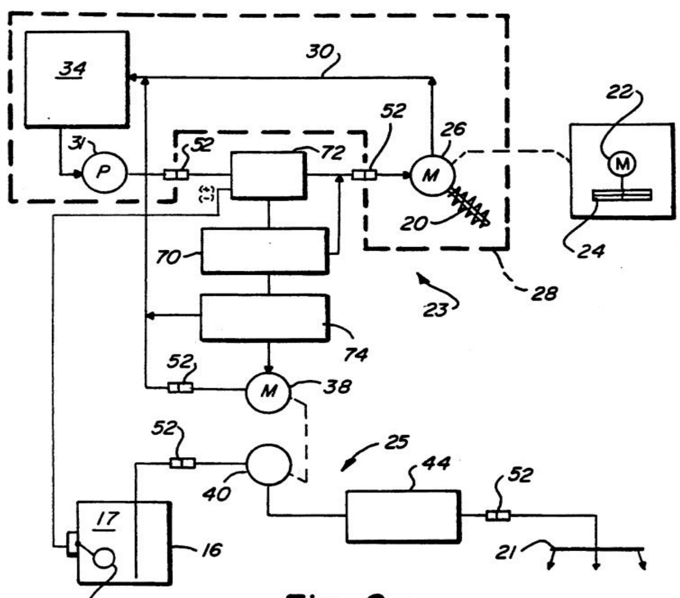


Fig_9

---

[5] Figure 8 of the '125 Patent shows a structure working in essentially the same manner, except that the positions of the flow control valve [48] and the direction control valve [50] are reversed. *See* '125 Patent Col. 7 ll. 29-40. Although I only discuss in detail the Figure 7 structure, its relative, shown at Figure 8, is also sufficiently disclosed.

Like the flow control valve [48] in Figure 7, the first flow control valve [70] sends some portion of the hydraulic fluid toward the conveyor motor [26] and the remaining portion of hydraulic fluid toward the liquid motor [38]. This diversion, common to many of the structures described in the patent, simply permits X% of the hydraulic fluid to be sent to the granular system and the remaining 100-X% of the hydraulic fluid to be sent to the liquid system. However, this structure uses a second diversion: before reaching its destination, the hydraulic fluid heading toward the liquid motor passes through another flow control valve [74] that diverts some additional portion of the hydraulic fluid away from the motor and back to the hydraulic reservoir [34]. Thus, the 100-X% of hydraulic fluid is further reduced (by an adjustable amount), which diminishes the power to the liquid pump motor and therefore the amount of liquid being pushed through the liquid delivery system. The specification describes this structure as follows:

> [i]n the embodiment shown in FIG. 9, the feed rate of the liquid delivery system 25 is controlled entirely through the hydraulic system 28. This eliminates the need for the liquid flow control valve 42. Rather, the first and second variable control values [sic] 70 and 74, as well as directional flow control valve 72, are placed in the hydraulic system 28 upstream of the liquid system motor 38.
>
> . . . [D]epending on the position of the direction flow control valve 72, the liquid delivery system 25 is either on or off. . . . If the direction flow control valve 72 is on, then the hydraulic fluid is directed through the first variable flow control valve 70, which sets [a certain] percentage of reduction . . . . A percentage of hydraulic fluid is diverted to the liquid delivery system 25, and the remainder is used to drive the granular delivery system 23. Hydraulic fluid then passes through the second variable flow control valve 74. At the control valve 70, the feed rate of the liquid delivery system 25 is set. Depending on the setting of the second variable flow control valve 74, the liquid delivery system 25 operates at a full feed rate for the liquid 17 or at a lesser feed rate. In this manner, the amount of hydraulic fluid supplied to the pump motor 38 controls the feed rate of the liquid 17, rather than the flow control valve 42 of the other alternative embodiments.

’125 Patent col. 7 l. 41 - col. 8 l. 25.

Bosch takes issue with this purely hydraulic structure, arguing that the prosecution history of the patent limits claim 1 to structures that include liquid flow control valves. Bosch notes that the original ’125 Patent application included, as a necessary element of original claim 1, a liquid flow control valve. *See* ’125 Patent File, Application at 23 (including as part of the claim “a flow control valve for taking a selected amount of liquid from said liquid delivery system and returning said liquid to a storage tank”). Claim 2 of the original application incorporated claim 1 and added an additional “means for altering the granular delivery system feed rate directly dependent upon the feed rate of the liquid delivery system.” *Id.* In rejecting these claims, the PTO noted that original claim 1 was not “patentably distinct” from a similar claim in another pending patent application. ’125 Patent File, Feb. 22, 1991 Examiner’s Action at 2-3. Original claim 2 was problematic because it was dependent on the rejected claim 1, but the PTO noted that claim 2 “would be allowable if rewritten in independent form including all of the limitations of the base claim.” *Id.* at 3. Bristol then amended the claims, rewriting claim 1 into its present means-plus-function format. *See* ’125 Patent File, Amendment at 3-5, 16; *see also* Bristol Reply at 15-16. Importantly, Bristol represented that “[c]laim 1 has been amended by incorporating the limitations of claim 2 therein.” ’125 Patent File, Amendment at 16. From this history, Bosch makes the following three-step argument: (1) original claim 2 incorporated the limitations of original claim 1, which included the limitation of a liquid flow control valve; thus (2) original claim 2 required a liquid flow control valve; meaning (3) Bristol’s subsequent representation that new claim 1 incorporated old claim 2 necessarily means that new claim 1 has the limitation of a liquid flow control valve. *See* Bosch Br. at 45.

Bosch is correct that, under the doctrine of prosecution disclaimer, a patent's prosecution history can narrow the meaning of claim terms. *See, e.g.*, *Southwall Technologies, Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995). But a patentee's statement during the prosecution must be sufficiently precise in order for such a limitation to attach. *See, e.g.*, *Vita-Mix Corp. v. Basic Holding, Inc.*, 581 F.3d 1317, 1324 ("A patentee may, through a clear and unmistakable disavowal in the prosecution history, surrender certain claim scope to which he would otherwise have an exclusive right by virtue of the claim language."); *Purdue Pharma L.P. v. Endo Pharmaceuticals Inc.*, 438 F.3d 1123, 1136 (Fed. Cir. 2006) ("Under the doctrine of prosecution disclaimer, a patentee may limit the meaning of a claim term by making a clear and unmistakable disavowal of scope during prosecution."). The Federal Circuit has "consistently rejected prosecution statements too vague or ambiguous to qualify as a disavowal of claim scope." *Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1325 (Fed. Cir. 2003). This requirement of express disclaimer makes sense in light of the fact that "prosecution history represents an ongoing negotiation between the PTO and the applicant" and therefore "often lacks the clarity of the specification." *Phillips*, 415 F.3d at 1317; *see also Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1289 (Fed. Cir. 2009) ("[O]wing in part to the inherent ambiguities of prosecution history, the doctrine of prosecution disclaimer only applies to unambiguous disavowals.").

Bristol's prosecution statements are too ambiguous to invoke the doctrine of prosecution disclaimer. Nowhere in the prosecution history did Bristol expressly state that new claim 1 incorporated, for all functions, a liquid flow control valve. Nor does new claim 1 actually reference such a valve. Bosch's argument requires accepting that, when Bristol stated that original claim 1 had been amended to "incorporat[e] the limitations of [original] claim 2," Bristol meant to incorporate not only the *express* limitations of original claim 2, i.e., a "means for altering the granular delivery system feed rate directly dependent upon the feed rate of the liquid delivery system," but also the limitations contained in original claim 1, i.e., the liquid flow control valve, that were *implicitly* incorporated into original claim 2 by virtue of it being dependent on original claim 1. Whatever the merits of this proposition as a matter of logic, it is not a "clear and unambiguous disavowal" of any structure lacking a liquid flow control valve. In sum, I find that a structure using flow control valves in the hydraulic fluid lines, rather than a liquid flow control valve, is a disclosed structure clearly linked to the function of setting the liquid material feed rate.

In addition to the three structures discussed above, Bristol contends that the '125 Patent discloses a number of other valves, pumps, and combinations that perform the function at issue. Although Bristol is not entirely consistent between its claim definition chart and its claim construction brief, it appears to point to three additional structures: (1) the liquid system pump alone (Bristol Br. at 22, 24; '125 Patent Claim 1 Chart at 7); (2) the combination of a direction control valve with flow control valves (Bristol Br. at 22, 23); and (3) a valve that is both a flow and direction control valve (Bristol Br. at 22).

However, none of these structures is clearly linked with the function of setting the liquid material feed rate.[6]

While the patent does disclose the use of the liquid pump in combination with other elements, i.e, the liquid motor and an adjustable liquid flow control valve, to selectively set the liquid material feed rate, I find no reference to the use of the liquid pump alone to do so. Even the language cited by Bristol demonstrates that the liquid pump is to be used in combination with the liquid flow control valve. Bristol Br. at 24; ’125 Patent Claim 1 Chart at 7 (citing ’125 Patent col. 4 l. 66 - col. 5 l. 1 (“The liquid pump 40 *partially* sets the feed rate of the liquid 17 supplied to the liquid flow control valve 42, which *finalizes* the amount or feed rate of the liquid 17 delivered to the nozzles 21.”) (emphasis added)).

Similarly, the patent does not disclose the use of a direction control valve as an element in selectively setting the liquid rate. As previously discussed, in all descriptions in the patent, the direction control valve is an “on/off” valve that activates or deactivates the liquid system. Although the direction control valve can direct hydraulic fluid to the flow control valves, as seen in the illustrations and accompanying descriptions of

---

[6] This clear linkage requirement is a recurring problem for Bristol. As discussed above, Bristol originally drafted the ’125 Patent to claim specific structures rather than functions. After the PTO initially rejected its patent application, Bristol rewrote many claims in means-plus-function form. However, the vast majority of the changes were to the claims themselves; Bristol made little more than minor edits to the specification. Because of this, the association between the structures in the specification and the functions in the claim is not as clear as it might have been had the claim been drafted as a means-plus-function claim at the outset, or had the entire patent been re-written. While the patent specification certainly contains many structures, the patent often fails to clearly link those structures to a particular function. Such stated but unconnected structures are inadequate to satisfy the rules for writing proper means-plus-function claims.

Figures 7 and 9, above, the direction control valve is an all or nothing device. One cannot "set[ ] the rate from a number of available settings" using a direction control valve. '125 Patent Claim 1 Chart at 7.

Finally, the patent does not disclose a combination flow control/direction control valve structure that performs the function in question. As discussed in Sec. III.A.1.a, *supra*, the patent does not disclose such a combined valve *at all*. Moreover, the patent does not explain how the direction control valve can vary the liquid material feed rate. In short, these final three structures referenced by Bristol are not adequately described or clearly linked to the function of selectively setting the liquid rate.

Bosch states, in passing, that "[t]he use of a material computer to control the liquid feed rate is not disclosed or equivalent to any system disclosed in the '125 Patent." Bosch Br. at 39. This reference is confusing, as Bristol does not appear to argue that such a computer accomplishes the liquid rate setting function. In any event, having reviewed the patent specification, I agree with Bosch that a material computer is not a disclosed structure clearly linked to this function. As for Bosch's point that such a computer is not equivalent to a disclosed structure, questions of equivalence are not before me at this time.

**c. Means for selectively setting the granular feed rate**

The second means clause at issue is the "means for selectively setting the granular delivery system feed rate over a selected range of feed rates of granular material." '125 Patent col. 10 ll. 64-66. Here, the parties' dispute is limited. They agree that the function is "setting the granular material feed rate, selected from a number of available settings, at which granular material is to be delivered." '125 Patent

Claim 1 Chart at 9. They also concur that the patent discloses the use of rotary valves as a structure to accomplish this function. Bristol Br. at 30; Bosch Br. at 12. In a manner similar to the use of the liquid motor and pump to push liquid material through the system, the granular system uses a conveyor and conveyor motor to distribute the granular material. *See* '125 Patent col. 4 ll. 3-9. The amount of hydraulic fluid, i.e., power, directed toward the conveyor motor thus controls the feed rate of the granular system. The patent explains that adjustable rotary valves are used to select and set the hydraulic fluid rate. *See id.* at col. 4 ll. 25-26 ("Rotary valves 32 in lines 27 and 29 determine the amount of hydraulic fluid delivered."). I agree with the parties that these rotary valves are clearly associated with the granular rate setting function.

The parties' dispute centers on whether a so-called ground speed control system is also a disclosed structure. As explained by Bristol, a ground speed control system uses a computer to regulate valves that control the amount of hydraulic fluid delivered to the conveyor motor, thereby regulating the power and speed of the motor. *See, e.g.*, Bristol Br. at 3. But regardless of whether such a system could selectively set the granular feed rate, the question is whether the specification discloses this structure with the requisite precision to clearly connect it to the rate setting function. *See, e.g.*, *Biomedino*, 490 F.3d at 953 ("The inquiry [in a means-plus-function claim] is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure.").

The sole reference to ground speed control in the patent specification is as follows:

> The granular material 15 and liquid 17 are deposited on the road 13 by the spinner 24. In a manner known in the art, the area covered is determined by the rotational speed of the spinner 24, while the amount of granular material 15 dispensed is determined by the speed of the conveyor 20, as well as mechanical considerations related to the hopper 14. These mechanical considerations, *as well as ground speed sensing control for increasing or decreasing the granular material feed rate dependent on vehicle speed*, are known in the prior art.

’125 Patent col. 4 ll. 39-49 (emphasis added). The problem with this reference, as recognized by Bosch, is that it does not mention using ground speed control to select and set a granular feed rate. *See* Bosch Br. at 12-13. Rather, it announces that ground speed control can be used to synchronize the feed rate with vehicle speed, adjusting the rate to account for an adjustment in speed. Synchronizing feed rate and speed is different than selecting, from a range of settings, the granular feed rate. Without a clear connection to the function at issue, this reference is insufficient to meet the demands of means-plus-function claiming. *See, e.g.*, *Elekta*, 344 F.3d at 1218 (“It is not enough simply to list a certain structure in the specification; that structure must also be clearly linked to a claimed function in order to be a corresponding structure for that function.”).

Bristol argues that ground speed control systems are “well known prior art devices” that have been used for this rate selection and setting purpose in the past. Bristol Br. at 29. Bristol cites specifically to two prior parents, U.S. Patent 3,344,993, issued in 1967, and U.S. Patent 3,776,431, issued in 1973. *Id.* As a threshold matter, the portion of the ’993 Patent relied on by Bristol appears to deal with the same issue discussed in the ’125 Patent – synchronization of rate and speed. *See* Bristol Br. at 29-30 (quoting ’993 Patent col. 2 ll. 32-47 (“The present invention contemplates such a spreader apparatus including control means for maintaining a preselected ratio between the speed of the conveyor and the speed of the truck. In general the control means includes a first means responsive to the speed of the conveyor or discharge means, a second means responsive to the speed of the truck, and a third means responsive to the first and second means for maintaining said preselected ratio. . . . In this manner the speed of the conveyor is varied generally directly with the speed of the truck."). But assuming that these prior patents deal with selective rate setting, the question is whether the existence of known prior art, and even its reference in the '125 Patent, is sufficient to "clearly associate" the structure in the prior art with the function in question. The Federal Circuit has indicated that it is not.

In *Biomedino, LLC v. Waters Technologies Corp.*, the Federal Circuit considered whether a means-plus-function claim involving control means for operating valves disclosed sufficient structure when it stated in the specification that this function could be performed using known methods and equipment. 490 F.3d at 950-51. The patentee argued that prior art established specific ways to operate the valves, and that a person skilled in the art would identify these prior art structures by way of the "known methods" reference in the patent. *Id.* at 951. The Federal Circuit rejected this argument, finding that reference to "known methods" cannot satisfy the means-plus-function requirement that there be "corresponding structure . . . *described* in the specification." 35 U.S.C. § 112 ¶ 6; *see also Biomedino*, 490 F.3d at 953. The court distinguished its decision in *Atmel Corp. v. Information Storage Devices, Inc.*, in which it held that a structure *was* sufficiently disclosed when the specification referenced "known . . . techniques" for accomplishing a certain function and then immediately referenced an article that, according to the patentee's expert, indicated to persons skilled in the art "the precise structure of the means recited in the specification." *Biomedino*, 490 F.3d at 952 (citing *Atmel*, 198 F.3d at 1382). The *Biomedino* court noted the "significant difference" between a patent specification that expressly included an article describing a structure for accomplishing the known technique and a patent specification that merely referenced that known techniques were out there. 490 F.3d at 952-53.

The lesson of *Biomedino* and *Atmel* is that, while incorporation of prior art or other extrinsic material to disclose structure may be permissible, that material must be explicitly referenced and clearly linked to the function in question. Here, there is nothing in the specification to indicate that a person skilled in the art should look to the prior patents to find the precise structure for using ground speed control to selectively set the granular feed rate. The specification does not, for example, say that "known techniques involving ground speed control are used to selectively set the granular feed rate," followed by an explicit cite to the relevant prior patents. *Compare Atmel*, 198 F.3d at 1382 ("[T]he specification plainly states that 'known Circuit techniques are used to implement high-voltage circuit 34. *See* On-Chip High Voltage Generation in NMOS Integrated Circuits Using an Improved Voltage Multiplier Technique, IEEE Journal of Solid State Circuits . . . .'"). Rather, the '125 Patent merely lists the prior patents as two of 13 "References Cited" at the outset of the patent, with no tie to any structure or function. There is nothing connecting those prior patents, or the ground speed control structures purportedly discussed therein, to the granular feed rate function. Under these circumstances, the fact that using ground speed control to accomplish selective rate setting may have been disclosed in the prior patents and known to persons skilled in the art is not sufficient to make this ground speed control an adequately disclosed structure. *See Atmel*, 198 F.3d at 1382 (noting that the principle that "the knowledge of one skilled in the particular art may be used to understand what structure(s) the specification discloses" "may only be employed in relation to structure that is disclosed in the specification").

In sum, neither the reference to ground speed control in the patent specification nor the existence of prior art clearly and distinctly links ground speed control to the function of selectively setting the granular feed rate. For that reason, I find that the only disclosed structures for accomplishing this function are the rotary valves discussed above.

**d. Means for maintaining a granular/liquid ratio**

The third means clause at issue is the "means for maintaining a predetermined ratio of the feed rate of liquid material to the feed rate of granular material." '125 Patent col. 10 ll. 66-68. Unlike the previous clauses, the parties dispute the precise function. Thus, I first "identify the claimed function using traditional tools of claim construction." *Omega Engineering*, 334 F.3d at 1330.

The focus of the parties' disagreement is over the meaning of "maintaining a predetermined ratio." Bristol contends that the function is the *maintenance* of the ratio of liquid to granular. *See* '125 Patent Claim 1 Chart at 10. Bosch, on the other hand, argues that the function is the ability to *select* a ratio of liquid to granular. *Id.* Although they disagree over the meaning, the parties provide little briefing or argument to support their interpretations.

There is nothing in the phrase "maintaining a predetermined ratio" that suggests it has any particular meaning in the field of hydraulic arts. Rather, the words are "commonly understood" and thus construction "involves little more than the application of [their] widely accepted meaning." *Phillips*, 415 F.3d at 1314. In such a case, reference to general purpose dictionaries is a useful tool. *Id.* "Maintain" means, quite simply, "to keep in an existing state." Merriam-Webster's Collegiate Dictionary 749 (11th ed. 2007). And "predetermine" means "to determine beforehand" or "to impose a direction or tendency on beforehand." *Id.* at 978. The common meaning of "maintaining a predetermined ratio" therefore means keeping in an existing state a ratio that had been selected beforehand. This suggests that the focus of the function is on the maintenance of a ratio that has already been set.

A look at the context in which the phrase is used further supports this interpretation. *See Phillips*, 415 F.3d at 1314 ("[T]he context in which a term is used in the asserted claim can be highly instructive."). The first two means clauses of claim one, which directly precede the "maintaining a predetermined ratio" clause, refer to selecting a feed rate for the liquid and granular material, respectively. These selections create a ratio. For example, if the liquid feed rate selected (in connection with means clause 1) is one gallon per mile and the granular feed rate selected (in connection with means clause 2) is 100 pounds per mile, the ratio would be one gallon to 100 pounds. It is this "predetermined" ratio that is "maintained" in connection with means clause 3.

For these reasons, I find that the claimed function is, as Bristol argues, the maintenance – as that word is commonly understood – of the ratio of liquid to granular that has already been determined through selectively setting those materials' feed rates. That is, as the speed of distribution of one substance increases or decreases, the speed of distribution of the other substance similarly varies in a manner that keeps the ratio between the two constant. *See* '125 Patent col. 5 ll. 38-46 ("In all embodiments of the liquid delivery system 25 the connection between the granular delivery system 23 and the pump 40 provides for synchronous delivery of liquid 17. The faster that granular material 15 is delivered by the granular delivery system 23, specifically the conveyor motor 26, the more rapid a rate that liquid 17 is applied. This is necessary to keep the ratio of the liquid 17 to the granular material 15 constant, i.e., synchronous.").

I must next identify any associated structures that perform this function of keeping the preset ratios in sync. Bosch once again asserts that the prosecution history requires that a liquid flow control valve be a part of any claim 1 structure. For the reasons discussed in Sec. III.A.2.b, *supra*, I reject this argument. Bristol, on the other hand, argues that the patent discloses mechanical, hydraulic, and electric structures. I consider each in turn.

**i. Mechanical**

Bristol first contends that the patent discloses a mechanical structure for accomplishing the ratio maintenance function. I agree. In at least two places, the specification describes using a mechanical connection to preserve synchronized feed rates:

> The liquid delivery system 25 is interconnected to the granular material delivery system 23 to synchronize the feed rate of the liquid 17 to the granular material 15.
>
> The liquid pump 40 of the liquid delivery system 25 is mechanically connected through a gear box 46 to a shaft of the conveyor 20 in a mechanical embodiment. (FIG. 3).

’125 Patent col. 4 ll. 55-61.

> The mechanical embodiment of FIG. 3 directly connects a rotating shaft of the conveyor 20 to the liquid system pump 40. (FIGS. 3 and 4). The connection establishes a synchronous feed rate between the liquid 17 and the granular material 15.

*Id.* col. 5 ll. 62-66. A structure using a mechanical connection between the liquid pump and the granular system conveyor is disclosed and clearly linked to the ratio maintenance function.

**ii. Hydraulic**

Bristol also contends that hydraulic structures for maintaining ratios are disclosed. Again, I agree. Specifically, the patent identifies the structures described in Figures 5-10 as using hydraulics to maintain a synchronized ratio. *See* ’125 Patent col. 4 ll. 55-65 (“The liquid delivery system 25 is interconnected to the granular material delivery system 23 to synchronize the feed rate of the liquid 17 to the granular material 15. . . . In the hydraulic embodiments of FIGS. 5 through 10, the pump 40 is mechanically connected to the liquid system motor 38, which is in fluid communication with the hydraulic system 28 of the granular delivery system 23.”). Those figures and the accompanying descriptions show two alternative hydraulic structures that perform this function.

The first such structure uses hydraulic fluid in a single flow path, in conjunction with a mechanical connection between the liquid system motor and the liquid pump, to maintain synchronization between the liquid and granular feed rates. This structure is illustrated in Figures 5, 6, and 10 of the patent:

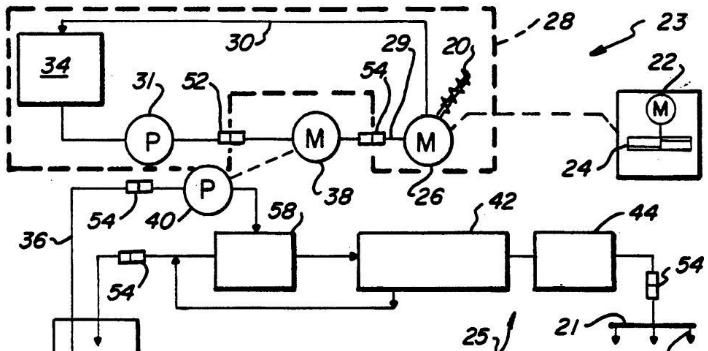



Fig_5

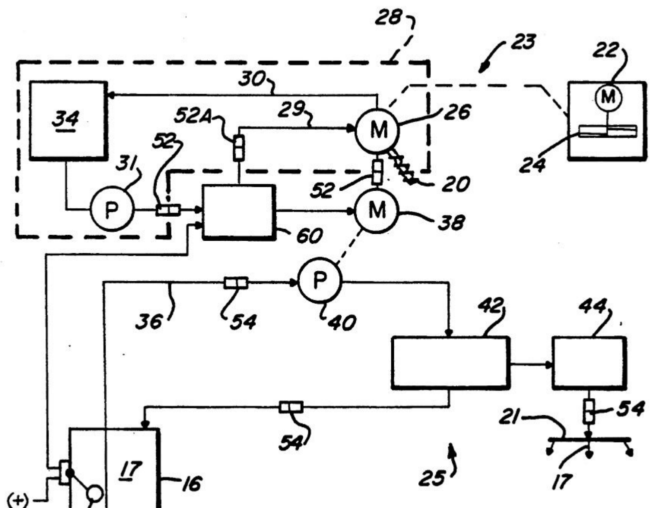



Fig_6

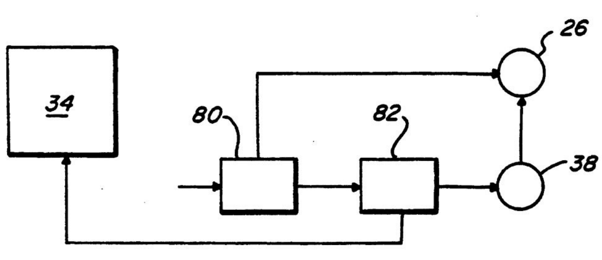



Fig_10

As can be seen from these figures, hydraulic fluid is sent from the hydraulic pump [31, not shown in Figure 10] directly through the liquid system motor [38] and to the granular system conveyor motor [26], meaning that both motors receive the same amount of power.  The liquid system motor is mechanically connected to the liquid pump [40, again not shown in Figure 10], which forces the liquid material through the system. Given this structure, an increase or decrease in the force of the hydraulic fluid will increase or decrease the speed of the liquid system motor – and thus the liquid system pump – by the same amount that it increases or decreases the speed of the granular system conveyor motor.  The ratios of the two systems are thereby consistently maintained.  The key to this structure is a single stream of hydraulic fluid powering both the liquid and granular system motors, along with the mechanical interconnection of the liquid system motor with the liquid pump.

Figures 7, 8, and 9 disclose a slightly different structure for accomplishing this synchronization.  They demonstrate the use of at least one hydraulic flow control valve upstream of both the liquid system motor and granular system conveyor motor:

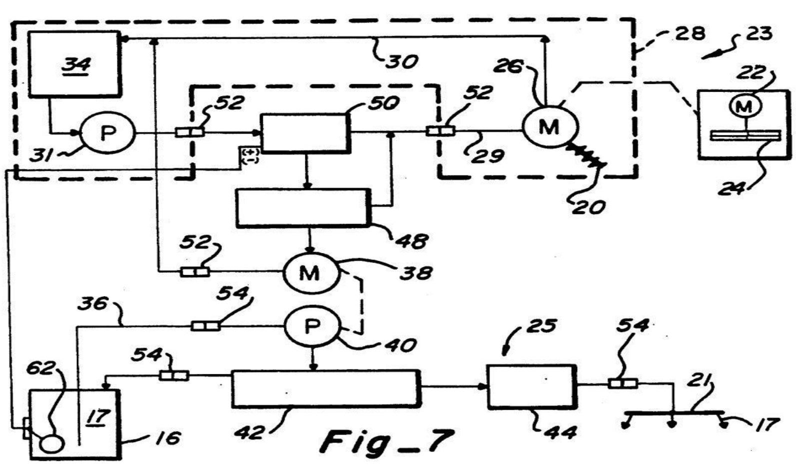



Fig_7

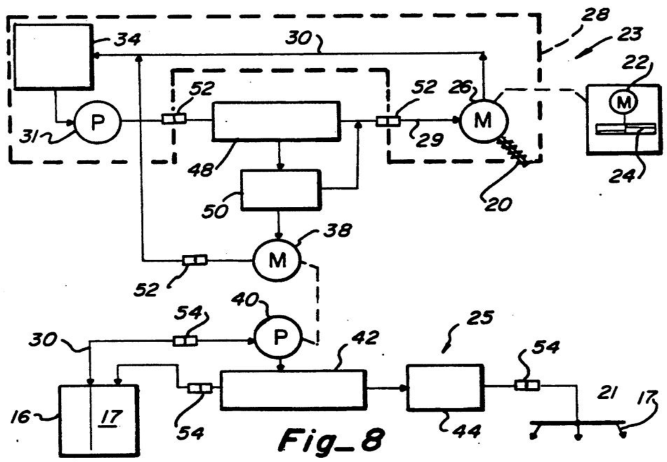



Fig_8

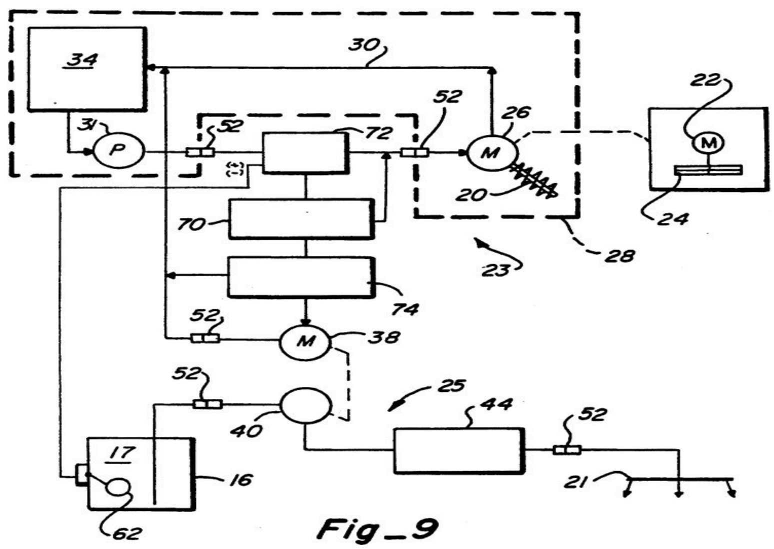



Fig_9

Unlike Figures 5, 6, and 10, in which the liquid system motor [38] and the granular system conveyor motor [26] see the same flow of hydraulic fluid, here, by way of the flow control valves, that fluid is divided between the two. In Figures 7 and 8, the flow control valve [48] sends X% of the hydraulic fluid to the granular conveyor motor and 100-X% to the liquid motor. In Figure 9, that 100-X% is further reduced by a second flow control valve [74]. But in all cases the flow control valves permit a constant ratio of power to be maintained between the granular and liquid systems. That is, if the valves are set so that 70% of the hydraulic fluid goes to the granular system conveyor motor and the remaining 30% goes to the liquid system motor, then regardless of the amount and force of hydraulic fluid pumping through the system, the 70:30 ratio will remain consistent. The key to this structure is a flow control valve upstream of the liquid and granular motors, again in combination with the mechanical interconnection of the liquid system motor with the liquid pump.

In addition to these two basic structures, Bristol argues that a *liquid* flow control valve performs the rate maintenance function. Bristol Br. at 32. Bristol cites to no specific language in the specification or prosecution history to support this argument. It is true that the specification and figures disclose that a liquid control valve may be a part of the two structures discussed above. *See, e.g.*, '125 Patent col. 6 ll. 1-25. However, nothing in the patent suggests that the liquid flow control valve is a *necessary* part of any structure for maintaining a ratio of liquid to granular feed rates. *See Asyst Technologies, Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370 (Fed. Cir. 2001) ("Structural features that do not actually perform the recited function do not constitute corresponding structure . . . ."). Moreover, I find no indication that the liquid material flow control valve can be used *independently* – without the other valves, pumps, and motors described above – to maintain, rather than simply select, a ratio. In short, a liquid flow control valve is neither an independent structure nor a necessary part of any structure for accomplishing this function.

Bristol also argues that "the '125 Patent teaches that other arrangements of the valves and motors that are apparent from the specific arrangements illustrated and discussed would also be within the scope of this means clause." Bristol Br. at 32-33 (citing ’125 Patent col. 10 ll. 31-33 (“Other arrangements of the valves and motors will be apparent to those of ordinary skill in the art.”)). The Federal Circuit has expressly rejected this sort of argument, that one skilled in the art could figure out additional structures. *See, e.g.*, *Elekta*, 344 F.3d 1219-20; *Fonar*, 107 F.3d at 1551-52 (“The [patent] specification discloses use of a generic gradient wave form. Although it states that other wave forms may be used, it fails to specifically identify those wave forms. Thus, under section 112, ¶ 6, claim 12 is limited to use of a generic gradient wave form and its equivalents.”). Rather, structures must be actually disclosed in the specification. The two structures discussed above are the only structures identified in the specification for hydraulically maintaining a predetermined ratio of the feed rates.

**iii. Electronic**

Bristol contends that the patent also discloses electronic structures for accomplishing this function. Here, I disagree. Bristol first cites to the introductory portion of the specification, which states:

> The liquid delivery system is mechanically, electronically or hydraulically connected to the granular delivery system. A motor of the liquid delivery system drives a liquid pump of the liquid delivery system. The feed rate of the liquid delivery system is interconnected to the granular delivery system for synchronous operation.

’125 Patent col. 2 ll. 60-66. Although, as discussed above, this language is sufficient to define what “interconnected” means in the claim terms, it does not disclose an actual structure for performing the synchronization function by electronic means.

Bristol further cites to a portion of the specification addressing electronic measurement of feed rates:

> Those of ordinary skill in the art will appreciate that reduction, or proportional change, of the feed rate of the granular delivery system 23 may result from other mechanical and electronic means. Specifically, the liquid feed rate could be measured electronically, and a signal proportional to the feed rate would proportionately open and close a valve (not shown) in the hydraulic system 28. The opening and closing of the valve would affect the amount of hydraulic fluid supplied to the conveyor motor 26, raising or lowering the feed rate of granular material.

*Id.* col. 9 ll. 31-41. But as Bristol itself appears to concede, this reference is associated with a different function – the reduction of the granular feed rate. *See* Bristol Br. at 31. Even assuming this sort of electronically controlled valve could synchronize the feed rate ratios, "[i]n order to qualify as corresponding, the structure must not only perform the claimed function, but the specification must clearly associate the structure with performance of the function." *Cardiac Pacemakers*, 296 F.3d at 1113-14; *see also Elekta*, 344 F.3d at 1218 ("It is not enough simply to list a certain structure in the specification; that structure must also be clearly linked to a claimed function in order to be a corresponding structure for that function."). There is no such association here.

Finally, Bristol argues that a person skilled in the art would be able to, "without undue experimentation," construct an electronic structure to accomplish this ratio maintenance function. Bristol Br. at 32. As already discussed in conjunction with the hydraulic structures, this "a person could figure it out" test is not the standard in a means-plus-function context. For all of these reasons, I find that the '125 Patent does not disclose an electronic structure for maintaining a ratio between the feed rates.

**e. Means for variable reduction**

The final claim 1 means clause at issue is the "means operative in response to actuation of said liquid delivery system for reducing by a variably selected percentage the quantity of granular material delivered by said granular material delivery system while maintaining said predetermined ratio of the feed rates of delivery of liquid material and granular material." '125 Patent col. 10 l. 68 - col. 11 l. 6. The parties again put forward slightly different interpretations of the claimed function. There is no disagreement over the final phrase – the reference to the "predetermined ratio" – and I construe that phrase to have the same meaning as in means clause 3, discussed above. *Paragon Solutions, LLC v. Timex Corp.*, 566 F.3d 1075, 1087 (Fed. Cir. 2009) ("'We apply a presumption that the same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims.'" (quoting *PODS, Inc. v. Porta Stor, Inc.*, 484 F.3d 1359, 1366 (Fed. Cir. 2007))).

There also seems to be agreement on the phrase "reducing by a variably selected percentage the quantity of granular material delivered by said granular material delivery system," and I construe it to mean reducing the quantity of granular by a selected percentage that can be changed. *See, e.g.*, Merriam-Webster's Collegiate Dictionary 1383 (11th ed. 2007) (defining "variable" as "able or apt to vary; subject to variation or changes").

As for the first phrase – "means operative in response to actuation of said liquid delivery system" – Bristol argues that there must be a "signal" received that the liquid system has been activated. It is not clear whether Bristol means "signal" in a broad sense, e.g., any type of sign, or in a narrower sense, e.g., an actual physical, electronic impulse. *See id.* at 1159 (defining "signal" as both a "sign" and "a detectable physical quantity or impulse (as a voltage, current, or magnetic field strength) by which messages or information can be transmitted”). Nothing in the patent suggests that it is only upon an electronic “signal” that the variable reduction takes place. Rather, the specification seems to contemplate a broad array of methods for affecting reduction. *See* ’125 Patent col. 9 ll. 31-34 (“Those of ordinary skill in the art will appreciate that reduction, or proportional change, of the feed rate of the granular delivery system 23 may result from other mechanical and electronic means.”). Therefore, I find that the function of this means clause is that, in response to the activation of the liquid delivery system – however that activation is indicated – the amount of granular material is reduced by a set percentage, that can be changed, while also maintaining the pre-set ratio of liquid to granular feed rates discussed above.

Bristol contends that the patent discloses several structures for accomplishing this function: certain valve combinations; a liquid flow rate sensor; and a ground speed control system.

**i. Valve combinations**

The patent describes various combinations of direction and flow control valves that perform the variable reduction function. First, the specification explains that a direction control valve and flow control valve may be placed upstream of both the granular system conveyor motor and the liquid system motor, with the flow control valve diverting some percentage of the hydraulic fluid to the liquid system. This structure is illustrated in Figure 7:

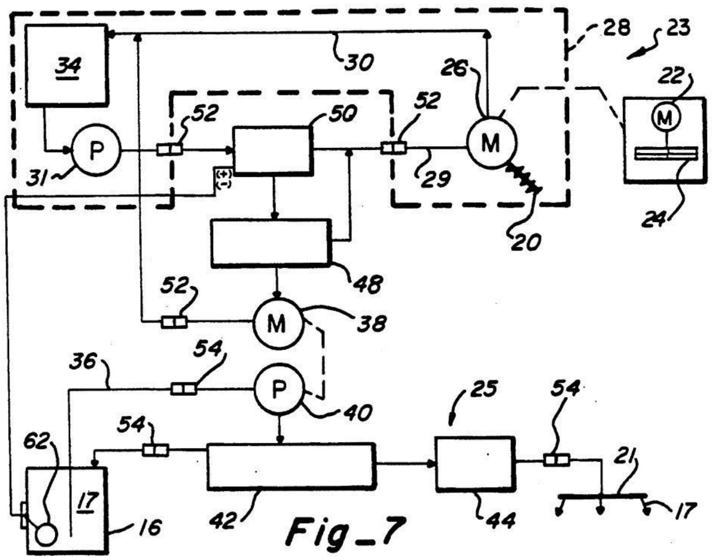



Fig_7

Here,

> the hydraulic direction control valve 50 is utilized in a first setting to solely direct fluid to the separate conveyor motor 26 or, through the hydraulic flow control valve 48, in a second setting directs fluid to the liquid system motor 38 and the conveyor motor 26. . . . If the flow control valve 48 is selected by the direction control valve 50, a selected constant percentage of the hydraulic fluid is available to operate the liquid system motor 38, with the balance operating the separate conveyor motor 26.
>
> . . . . The percent of fluid diverted to the motor 38 is set at a constant but may be changed to any of an infinite number of settings over a range by the operator, altering the feed rate of the granular delivery system 23. The flow control valve 48 and direction control valve 50 thereby define diversion means for diverting hydraulic fluid from the granular material delivery system 23 to the liquid delivery system 25.

’125 Patent col. 6 l. 64 - col. 7 l. 17. In other words, upon activation of the liquid system by use of the direction control valve [50], the flow control valve [48] reduces the percentage of hydraulic fluid being sent to the granular system. This reduction is variable in that the flow control valve can be adjusted to set the proper amount of diversion (e.g., 10% diversion, 20% diversion, etc.).[7]

Bristol also points to Figure 9 of the patent. As discussed previously, Figure 9 uses two hydraulic flow control valves instead of one hydraulic flow control valve and one liquid flow control valve. *See* Sec. III.A.2.b, *supra*. However, for the purpose of accomplishing the variable reduction function, Figure 9's structure is no different from the structures just discussed. Only one flow control valve in Figure 9 accomplishes the variable reduction; the second flow control valve relates to setting the liquid feed rate. *See* '125 Patent col. 8 ll. 9-13 (discussing Figure 9: "If the direction flow control valve 72 is on, then the hydraulic fluid is directed through the first variable flow control valve 70, which sets the percentage of reduction as has been discussed with respect to FIGS. 7 and 8."). Bristol admits as much in its brief. *See* Bristol Br. at 35 ("In Fig. 9, the direction control valve 72 is used to signal when the liquid material delivery system is on. . . . Flow control valve 70 is used to set the percentage of decrease of granular flow rate. Flow control valve 74 is used to set the ratio of the liquid flow rate to the granular flow rate."). Figure 9 does not disclose an additional structure for accomplishing the variable reduction function.

The specification also discloses a system, illustrated in Figure 10, that uses a direction control valve and flow control valve to divert a percentage of hydraulic fluid back to the hydraulic reservoir.

---

[7] As discussed in Sec. III.A.2.b, *supra*, the positions of the direction valve [50] and flow control valve [48] are immaterial. Figure 8 shows a structure with the two valves reversed, and is also a disclosed structure for accomplishing the variable reduction function.

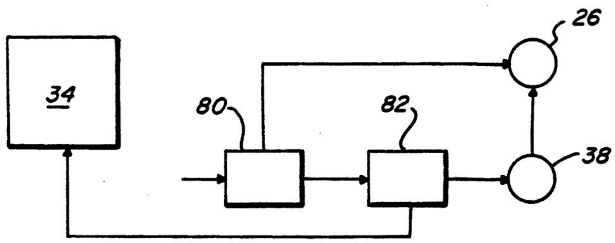



Fig_10

This structure also uses direction and flow control valves placed upstream of the liquid and granular motors to achieve variable reduction. *See* '125 Patent col. 9 ll. 51-54 (discussing Figure 10 and noting that reduction "is accomplished by a variable flow control valve 82 and a direction control valve 80 similar to valves 48 and 50 described in reference to the embodiment shown in FIG. 7."). However, unlike the previous structures, the flow control valve does not divert the hydraulic fluid toward the liquid system. Rather, this structure

> reduce[s] the feed rate of the granular delivery system 23 by diverting hydraulic fluid from the conveyor motor 26 in a proportional amount and returning the hydraulic fluid to the reservoir 34 rather than to the liquid delivery system 25. Such a diversion is accomplished by a variable flow control valve 82 and a direction control valve 80 . . . . The variable flow control valve 82 is placed in line so as to be upstream from the conveyor motor 26. A proportional amount of hydraulic fluid is thus directed to the liquid and conveyor motors 38 and 26 and the remaining and proportional amount of hydraulic fluid in the hydraulic system 28 is returned to the reservoir 3 by the variable flow control valve 82.
>
> . . .
>
> The liquid system motor 38 in the embodiment of FIG. 10 could be placed in series with the conveyor motor 26 on either side thereof. The only requirement is that the liquid system motor 38 be downstream of the variable flow control 82. . . .
>
> In the embodiment of FIG. 10, reduction of the granular delivery system 23 occurs by returning a selected percentage, the remaining proportional amount of hydraulic fluid to the reservoir 34 at a position prior to or

> upstream of the conveyor motor 26. Returning the hydraulic fluid to the reservoir 34 lowers hydraulic flow and, therefore, the speed of the conveyor motor 26.

’125 Patent col. 9 l. 46 - col. 10 l. 40. In other words, in this structure the flow control valve diverts X% of the hydraulic fluid away from *both* systems and back toward the hydraulic reservoir. The remaining 100-X% flows through the two motors. But regardless of the fact that the X% is sent to the reservoir rather than the liquid system, the structure still accomplishes a variable reduction in the granular system, which is the function at issue here.

Although Bosch concedes that Figure 10 accomplishes variable reduction, it appears to contend that Figure 10 should not be considered a corresponding structure because is does not also perform the function of selecting a ratio of liquid to granular material. *See* Bosch Br. at 22 n.4; 30 n.8; 32-36. I say “appears to contend” because, although Bosch at times states that Figure 10 is not a corresponding structure for *any* of the ’125 Patent claims at issue, its arguments about Figure 10’s selection function expressly concern only claims 15-17. *See id.* at 32-36. However, assuming Bosch is disputing that Figure 10 is a disclosed structure for the variable reduction function of claim 1, I cannot accept Bosch’s argument. There is nothing in the variable reduction means clause that suggests its function includes selecting a ratio. Rather, as noted earlier, the ratio selection function is accomplished by the first two means clauses – setting a liquid feed rate and a granular feed rate, respectively. *See* Sec. III.A.2.d, *supra*. Means clause 4 – the clause presently being discussed – reduces the granular rate while maintaining that previously set ratio. Bosch does not cite, nor have I found, any case suggesting that, where there is a multi-part claim with each sub-part described as its own means-plus-function claim, a structure that performs one sub-part function, e.g., variable reduction, must also perform other functions, e.g., selecting a ratio, in order to be valid. *Cf. In re Iwahashi*, 888 F.2d 1370, 1375 (Fed. Cir. 1989) (noting that where a claim is a combination of several means-plus-function limitations, "*each* means-plus-function definition shall be construed to cover the corresponding structure . . . .") (emphasis added).[8] As Figure 10 performs a variable reduction function, I find it to be a corresponding structure for that specific function.

---

[8] In certain cases, the Federal Circuit has required a corresponding structure to perform each of the functions of a single means clause. *See Cardiac Pacemakers*, 296 F.3d at 1114-16; *Epcon Gas Systems, Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022 (Fed. Cir. 2002). However, in these cases, one means clause identified numerous functions. *See Cardiac Pacemakers*, 296 F.3d at 1114-16 (construing means clause that read: "third monitoring means for *monitoring* the ECG signal produced by said detecting means for *activating* said charging means in the presence of abnormal cardiac rhythm in need of correction," to mean that one structure must perform the dual function of monitoring and activating); *Epcon Gas Systems*, (considering means clause that read: "control means which are operative to inject gas into the mold to fill out the mold cavity at a pressure that is at all times during the gas injection cycle substantially below the pressure of the stored gas supply and which are further operative, following the initial injection of gas into the mold and prior to the venting of the gas from the mold, to selectively increase the gas pressure within the mold, decrease the gas pressure within the mold, or maintain the gas pressure within the mold at a particular value," and finding that corresponding structure must "include at least that structure necessary to perform each of the functions recited as being performed by the 'control means'"). Here, by contrast, each of the four sub-parts of the "control means" is written as its own, independent means-plus-function claim. *See* '125 Patent col. 10 l. 60 - col. 11 l. 6 (claiming a "control means for controlling the synchronous feed rate of the granular and liquid materials, the improvements in said control means comprising [1] *means for* selectively setting the liquid feed rate within a range of feed rates, [2] *means for* selectively setting the granular delivery system feed rate over a selected range of feed rates of granular material; [3] *means for* maintaining a predetermined ratio . . . and [4] *means . . . for* [variable reduction]") (emphasis added). I find that the claim is best read as, essentially, four separate means limitations, each of which must be supported by a structure or structures in the specification.

**ii. Liquid flow rate sensor**

Bristol also contends that the patent discloses a liquid flow rate sensor that would, by way of electronic signal, decrease the granular flow rate upon activation of the liquid system. Bristol Br. at 36. The specification does reference an electronic sensor:

> Those of ordinary skill in the art will appreciate that reduction, or proportional change, of the feed rate of the granular delivery system 23 may result from other mechanical and electronic means. Specifically, the liquid feed rate could be measured electronically, and a signal proportional to the feed rate would proportionately open and close a valve (not shown) in the hydraulic system 28. The opening and closing of the valve would affect the amount of hydraulic fluid supplied to the conveyor motor 26, raising or lowering the feed rate of granular material.

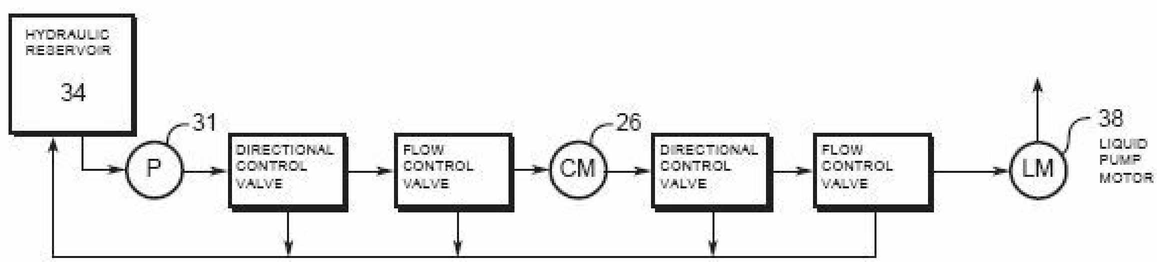
’125 Patent col. 9 ll. 31-41. However, there is nothing in this reference that clearly links the sensor to a reduction in granular feed rate upon activation of the liquid system. Rather, the structure appears to be aimed at permitting adjustment of the granular rate when the liquid system is already operating, i.e., when the “liquid feed rate could be measured electronically.” As the specification does not “clearly associate the structure with performance of the function,” *Cardiac Pacemakers, Inc.*, 296 F.3d at 1114, I cannot find this liquid flow rate sensor to be a disclosed structure for accomplishing the variable reduction function.

**iii. Ground speed control**

Lastly, Bristol contends that the ground speed control system discussed in the patent is a structure for variable reduction. This argument suffers from the same fatal flaw as Bristol’s liquid flow rate sensor argument. As discussed in Sec. III.A.2.c, *supra*, the only reference to a ground speed control system in the specification links that system to the function of synchronizing the granular feed rate to the speed of the vehicle itself. There is nothing in the patent clearly associating ground speed control with the variable reduction of the granular rate upon activation of the liquid system. Ground speed controls are not a disclosed structure.

### *3. Alternative Embodiment*

The parties raise a final issue with respect to the “control means” of claim 1. Bristol argues that the specification discloses an “alternative embodiment” – referred to as the Figure 10 Alternate Embodiment – that performs all of the control means functions discussed above. It illustrates this alternative embodiment as follows:




ALTERNATE EMBODIMENT
INTEGRATED WITH HYDRAULIC CONTROLS FOR CONVEYOR

Bristol does not contend that this structure is simply an alternative to the variable reduction structure illustrated in Figure 10. Rather, Bristol argues that this alternative structure comprises the variable reduction structure in combination with one of the structures for controlling the granular material feed rate and one of the structures for controlling the liquid material feed rate described in other sections of the patent. Bristol Reply at 18. Bosch’s primary objection to this alternate structure is that the ’125 Patent nowhere discloses a structure with a direction and flow control valve between the granular and liquid motors. *See* Bosch Br. at 26-27

Disclosed structures in a patent include not only the "preferred" or primary embodiment of a structure to accomplish the function in question, but also "any alternative structures identified." *Serrano*, 111 F.3d at 1583. The analysis of whether an alternate structure is disclosed is undertaken from the perspective of one skilled in the art, *Biomedino*, 490 F.3d at 950, and must include analysis of both the figures in the specification and the accompanying written description, *see Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1212 (Fed. Cir. 2002). However, a court must be cautious not to find an alternate structure just because a person skilled in the art would be capable of creating such a structure based on her knowledge and experience. As with any means-plus-function structure analysis, the alternate structure must actually be described in the patent specification. *See Elekta*, 344 F.3d at 1212 ("The correct inquiry is to look at the *disclosure* of the patent and determine if one of skill in the art would have understood that *disclosure* to encompass [the structure], not simply whether one of skill in the art would have been able to [construct the structure].") (emphasis in original).

Bristol contends that the patent demonstrates two different ways to construct the alternate structure. Both derive from Figure 10, which, as noted above, illustrates a structure in which hydraulic fluid passes through a direction control valve [80], then a flow control valve [82], then the liquid system motor [38], and finally the granular system conveyor motor [26]:

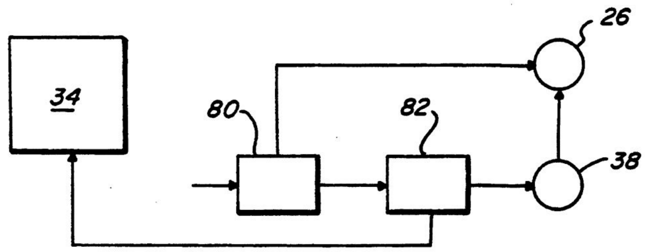



*Fig_10*

Bristol begins its first construction by noting that the positions of the liquid and granular motors could be interchanged:

> The liquid system motor 38 in the embodiment of FIG. 10 could be placed in series with the conveyor motor 26 on either side thereof. The only requirement is that the liquid system motor 38 be downstream of the variable flow control 82. Other arrangements of the valves and motors will be apparent to those of ordinary skill in the art.

’125 Patent col. 10 ll. 27-33. Bosch does not dispute this step. Bosch Br. at 25. Bristol then contends that because Figure 10, with the motors reversed, demonstrates only variable reduction, a person wishing to construct the entire claim 1 “control means” would have to add the necessary structures for controlling the granular and liquid material feed rates. Bristol Br. at 20. One way to do this, Bristol argues, is to look to the valve arrangements described in conjunction with Figure 9 and find that a direction and flow control valve placed upstream of the liquid motor can control the liquid material feed rate. *Id.* Thus, one simply need insert these two valves directly upstream of the liquid motor. Doing so results in a structure in which the hydraulic fluid passes through a direction and flow control valve before reaching the granular system conveyor motor and then passes through *another* direction and flow control valve – placed downstream of the granular system conveyor motor and therefore between the motors – before ending up at the liquid system motor.

The problem with Bristol's argument is that Figure 9 shows and describes the valves as being upstream, not downstream, of the conveyor motor. As explained in the specification, the direction and flow control valves – valves 70, 72, and 74 – function as follows:

> Hydraulic fluid passes through a direction control valve 72 downstream of the pump 31. As before, depending on the position of the direction flow control valve 72, the liquid delivery system 25 is either on or off. *If the flow control valve 72 is set to turn the liquid delivery system 25 off, then all the hydraulic fluid is directed toward the conveyor motor 26 of the granular delivery system 23.* If the direction flow control valve 72 is on, then the hydraulic fluid is directed through the first variable flow control valve 70, which sets the percentage of reduction as has been discussed with respect to FIGS. 7 and 8. A percentage of hydraulic fluid is diverted to the liquid delivery system 25, *and the remainder is used to drive the granular delivery system 23.* Hydraulic fluid then passes through the second variable flow control valve 74. At the control valve 70, the feed rate of the liquid delivery system 25 is set. Depending on the setting of the second variable flow control valve 74, the liquid delivery system 25 operates at a full feed rate for the liquid 17 or at a lesser feed rate. In this manner, the amount of hydraulic fluid supplied to the pump motor 38 controls the feed rate of the liquid 17, rather than the flow control valve 42 of the other alternative embodiments.

'125 Patent col. 8 ll. 2-25 (emphasis added). As the highlighted portions of this description make clear, the direction and flow control valves are upstream of both the granular and liquid motors. Thus, a person looking to the liquid feed rate control structure described in connection with Figure 9 would not, as Bristol argues, find that the valves could be placed downstream of the granular system conveyor motor.[9] It is of no

[9] Although Bristol only discusses the description associated with Figure 9, it includes in its brief, with little explanation, pictures of a portion of Figures 7 and 8 showing direction and flow control valves upstream of the liquid system motor. Bristol Br. at 21. However, like Figure 9, Figures 7 and 8 also describe direction and flow control valves upstream of the granular system conveyor motor, directing fluid either entirely to the granular system or to both the granular and liquid systems. *See* '125 Patent col. 6 l. 64 - col. 7. l. 1 ("In the embodiment shown in FIG. 7 the hydraulic

matter that such a person might understand the principles of hydraulics to permit such a placement; again, "[t]he inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure." *Biomedino*, 490 F.3d at 953. This first iteration of the Figure 10 Alternate Embodiment is not specifically disclosed in the patent.

Bristol's second iteration fares no better. Again, this iteration begins with the basic structure illustrated in Figure 10, with hydraulic fluid passing through the two valves, and then the liquid motor, and then the conveyor motor. However, instead of simply transposing the liquid and granular motors, Bristol contends that the conveyor motor can be "moved further upstream of the liquid motor, with the flow control and direction control valves remaining upstream of the liquid motor *but downstream of the conveyor motor.*" Bristol Br. at 23. Bristol relies on the following portion of the specification:

> The liquid system motor 38 in the embodiment of FIG. 10 could be placed in series with the conveyor motor 26 on either side thereof. The only requirement is that the liquid system motor 38 be downstream of the variable flow control 82. Other arrangements of the valves and motors will be apparent to those of ordinary skill in the art.

'125 Patent col. 10 ll. 27-33. This reference, however, simply reverses the positions of the liquid and granular motors. It does not describe moving the granular motor to the

---

direction control valve 50 is utilized in a first setting to solely direct fluid to the separate conveyor motor 26 or, through the hydraulic flow control valve 48, in a second setting directs fluid to the liquid system motor 38 and the conveyor motor 26."); *id.* col. 7 ll. 29-36 ("In the embodiment shown in FIG. 8, a desired percentage of hydraulic fluid is diverted at the variable flow control valve 48 from hydraulic system 28 to the liquid delivery system 25. The direction control valve 50 may restore the diverted percentage of hydraulic fluid to the separate conveyor motor 26 or activate the liquid delivery system 25 by supplying the diverted hydraulic fluid to the liquid system motor 38.").

other side of both the liquid system *and the direction and flow control valves*. If Bristol meant to disclose such a configuration, it was required to do so with specificity. *See Elekta*, 344 F.3d at 1211 ("If the specification is not clear as to the structure that the patentee intends to correspond to the claimed function, then the patentee has not paid [the] price [for claiming in a means-plus-function manner] but rather is attempting to claim in functional terms unbounded by any reference to structure in the specification."). The fact that the specification indicates that other valve and motor arrangements would be apparent to persons skilled in the art is again irrelevant. It is the specification itself, not the ingenuity of a hydraulic engineer, that must construct the alternate structure.

In short, I do not read the patent's figures or written description to disclose any structure in which the conveyor motor is placed upstream of the valves that control the liquid motor. It may be that such an arrangement is "elementary" to one skilled in the art. Bristol Br. at 25-26. But both of Bristol's iterations require taking a step beyond what is clearly disclosed in the patent. This is impermissible. "The public should not be required to guess as to the structure for which the patentee enjoys the right to exclude. The public instead is entitled to know precisely what kind of structure the patentee has selected for the claimed functions, when claims are written according to section 112, paragraph 6." *Elekta*, 344 F.3d at 1220.[10]

**B. Claim 15 of the '125 Patent**

The parties also dispute the meaning of certain portions of claims 15, 16, and 17 of the '125 Patent. However, most of these arguments are duplicative of their positions

[10] As I have noted previously, whether such a structure is equivalent, either pursuant to § 112 ¶ 6 or the doctrine of equivalents, is not before me at this time.

with respect to claim 1; the primary issue separately briefed is whether claims 15-17 require the ability to adjust the liquid to granular ratio. Bristol Br. at 36; Bosch Br. at 32-35; Bristol Reply at 4, 44-46. Therefore, I often reference the previous analysis to dispose of construction issues here.

#### *1. Means for driving the liquid pump*

The first disputed means clause in claim 15 is the "means for driving [the liquid system] pump." '125 Patent col. 13 ll. 12-13. The parties agree that the function of this means clause is to cause the liquid pump to operate at a certain speed. Joint Claim Construction Statement, '125 Patent Claim 15 [Docket No. 107-5] ("'125 Patent Claim 15 Chart") at 4. The parties further agree that one structure performing this function is the liquid system motor, which is mechanically connected to the liquid pump and is powered by hydraulic fluid. *Id.*; *see also* '125 Patent col. 4 ll. 61-65 ("In the hydraulic embodiments of FIGS. 5 through 10, the pump 40 is mechanically connected to the liquid system motor 38, which is in fluid communication with the hydraulic system 28 of the granular delivery system 23."). The parties' only disagreement is whether the pump can also be driven by connection to the granular system conveyor shaft. '125 Patent Claim 15 Chart at 4. The specification clearly states that it can. '125 Patent col. 4 ll. 58-61 ("The liquid pump 40 of the liquid delivery system 25 is mechanically connected through a gear box 46 to a shaft of the conveyor 20 in a mechanical embodiment."); *see also id.* at col. 5 ll. 62-65 ("The mechanical embodiment of FIG. 3 directly connects a rotating shaft of the conveyor 20 to the liquid system pump 40."). Both structures are adequately disclosed.

### *2. Control means*

The parties also dispute the proper construction of the "control means" clause of claim 15. This clause describes a "[m]eans for controlling said first means" – the means for driving the granular conveyor – and "said second means" – the means for driving the liquid system pump. '125 Patent col. 13 ll. 13-14. As with claim 1, claim 15 contains specific sub-clauses that comprise the patented improvements in the control means:

> [(1)] means for controlling said first means and thereby the quantity per surface area of granular material to be applied to the surface,
>
> [(2)] means for controlling said second means and thereby the amount of liquid per surface area applied to the surface as a function of the amount of granular material being applied to the surface and a selected ratio of liquid material to granular material, and
>
> [(3)] means for variably controlling said first means in response to the activation of said second means, for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second means.

*Id.* col. 13 ll. 15-27.

#### a. Means for controlling granular conveyor motor

The parties agree that the function of this first means clause – "means for controlling said first means and thereby the quantity per surface area of granular material to be applied to the surface" – is controlling the speed of the granular system conveyor motor. *See* '125 Patent Claim 15 Chart at 5. Their dispute is over precisely what structures accomplish this function. Beginning with the least controversial structure, I find that rotary valves placed upstream of the conveyor motor are such a disclosed structure. As discussed above, these rotary valves adjust the amount of hydraulic fluid flowing to the motor, thereby controlling its speed. *See* Sec. III.A.2.c, *supra*.[11]

Bristol argues that a ground speed control system is a disclosed structure to accomplish this conveyor motor control function. As described above, a ground speed control system synchronizes the speed of the conveyor to the speed of the vehicle. *See* Sec. III.A.2.c, *supra*. While the ground speed control was not sufficiently tied to the function of selectively setting the granular feed rate, *see id.*, I do find it clearly associated with the different, and more basic, function of controlling the granular conveyor speed. This function does not require selecting the speed of the conveyor from a range of speeds, as the earlier function did. Rather, the conveyor motor control function requires a structure that controls the speed, period – a function even Bosch concedes a ground speed control system performs. *See* Bosch Br. at 12 ("Bosch does not dispute that the patent mentions ground speed control as a method known in the prior art for increasing or decreasing conveyor speed . . . .").

However, I cannot agree that the other structures identified by Bristol accomplish this function. Bristol contends that the liquid system motor controls the speed of the

---

[11] To the extent they represent a functionally different structure, I also find that flow control valves placed upstream of the conveyor motor can serve to control its speed. In several places, the patent describes using such valves in the same manner as the rotary valves to control the hydraulic flow to, and therefore the speed of, the conveyor motor. *See, e.g.*, '125 Patent col. 5 ll. 27-37 ("In the embodiments shown in FIGS. 7 and 8, a hydraulic fluid flow control valve 48 and a direction control valve 50 are upstream of the conveyor motor 26. Hydraulic fluid flow is diverted from the hydraulic system 28 through the flow control valve 48, at the discretion of the operator, to between 0 and approximately 95% of the total hydraulic fluid flow. This provides much greater flexibility in adjusting the granular material 15 usage to the temperature, wind, depth and types of precipitation.").

conveyor motor. *See* ’125 Patent Claim 15 Chart at 5. Although the patent discloses several structures in which hydraulic fluid passes through the liquid motor before reaching the granular conveyor motor, the patent does not discuss using the liquid motor to actually control the conveyor motor speed. *See, e.g.*, ’125 Patent col. 6 ll. 1-12 (“In the embodiment shown in FIG. 5, . . . [t]he liquid system motor 38 is connected to the hydraulic system 28 intermediate to the pump 31 and the separate conveyor motor 26 at quick release disconnects 52, 54. The hydraulic fluid flow in the line 29 is used by the motor 38 to establish a rotary motion to turn the pump 40 of the liquid delivery system 25. The hydraulic flow in the line 29 also powers the conveyor 20 through the separate conveyor motor 26.”); *id.* col. 6 ll. 33-41 (“In the embodiment shown in FIG. 6, . . . [t]he conveyor motor 26 receives the fluid flow either directly or through the liquid system motor 38, mounted in line or in series with the conveyor motor 26, to turn the conveyor 20.”). Rather, the liquid motor is simply an element along the path of the hydraulic fluid. The liquid motor is not a structure for controlling conveyor speed.

Bristol also contends that a direction control valve controls the speed of the conveyor motor. *See* ’125 Patent Claim 15 Chart at 5-6. It is certainly true that the patent discloses structures with a direction control valve upstream of the conveyor motor. *See, e.g.*, ’125 Patent col. 6 ll. 33-45 (“In the embodiment shown in FIG. 6, using a hydraulic direction control valve 60, the granular material delivery system 2 selectively diverts all of the hydraulic flow away from the hydraulic system 28 to the liquid system motor 38 of the liquid delivery system 25. . . . In the second setting of the valve 60, only the operation of the separate conveyor motor 26 is selected.”). But as discussed in Sec.

III.A.2.a, *supra*, all references to direction control valves in the patent specify "on/off" valves, sending either all or none of the flow toward a given target. Understood within the context of the patent, I do not find such an "on/off" valve to control the speed of the conveyor motor, which implies some sort of ability to adjust and manipulate speed. Rather, the direction control valve simply sends all or none of its flow toward that motor.

Finally, Bristol contends that the Figure 10 Alternate Structure can accomplish conveyor speed control. *See* '125 Patent Claim 15 Chart at 5-6. However, I have already concluded that this structure is not actually disclosed in the specification. I therefore reject this argument as well.

**b. Means for controlling liquid motor**

The second means clause at issue describes a "means for controlling said second means and thereby the amount of liquid per surface area applied to the surface as a function of the amount of granular material being applied to the surface and a selected ratio of liquid material to granular material." '125 Patent col. 13 ll. 18-22. The parties agree that the "second means" refers to the liquid system motor and that the function includes controlling the speed of this motor. *See* '125 Patent Claim 15 Chart at 7; Bosch Br. at 32. However, they dispute the meaning of the terminal portion of the means clause, which requires control of the second means "as a function of . . . a selected ratio of liquid material to granular material." Bristol contends that a "selected ratio" indicates a single, set liquid to granular ratio, meaning that this function does not require the ability to adjust the liquid material feed rate. Bristol Reply at 45. Bosch, on the other hand, contends that "selected ratio" does contemplate adjustment, i.e., that the function requires not only control of the speed of the liquid motor, but also the ability to raise or lower the amount of liquid dispensed in relation to the amount of granular dispensed. Bosch Br. at 32.

In support of its position, Bristol notes that the phrase used in claim 15 (and claims 16 and 17), “a selected ratio of liquid material to granular material,” is different from the phrase used in claim 1, “means for selectively setting the liquid feed rate within a range of feed rates.” Bristol Reply at 45. Bristol concedes, as I have already concluded, that claim 1 requires the liquid rate (and by extension the liquid to granular ratio) to be adjustable. *See* Sec. III.A.2.b, *supra*. Invoking the canon of claim differentiation, Bristol argues that claim 15, with its distinctive wording, must therefore mean something different from claim 1’s adjustable ratio. *See, e.g.*, *Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1380 (Fed. Cir. 2006) (claim differentiation is the “‘presumption that each claim in a patent has a different scope’” (quoting *Versa Corp. v. Ag-Bag Int’l, Ltd.*, 392 F.3d 1325, 1330 (Fed. Cir. 2004))). Bristol contends that this something different is that, in claim 15, the “selected ratio” may be fixed.

Bosch responds with its own interpretive canon. It contends that reading the phrase to mean a fixed ratio would render it superfluous. *See* Bosch Br. at 33; *see also Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006) (“[C]laims are interpreted with an eye toward giving effect to all terms in the claim.”). More specifically, Bosch points out that this means clause requires controlling the liquid motor as a function of both “the amount of granular material being applied to the surface” and “a selected ratio of liquid material to granular material.” ’125 Patent col. 13 ll. 18-22.

Controlling the liquid motor as a function of the granular amount is another way of saying that there is some correlation between the liquid and the granular amount, say, 10 parts liquid to 100 parts granular. This results in a fixed ratio of the two materials (10 liquid:100 granular). Controlling the liquid motor as a function of a "selected ratio," Bosch argues, must mean something more than just a fixed, constant ratio; otherwise, this second function would be read out of the claim.

Because these two canons yield conflicting results, they are not particularly useful in construing this claim. Nor is reference to a general purpose dictionary or to case law useful, as both provide definitions of "select" that could either mean to choose a *single* ratio or to choose *among* ratios. *See* Merriam-Webster's Collegiate Dictionary 1125 (11th ed. 2007) (defining "select" as both "to choose . . . from a number or group" and "to make a choice"); 5A *Chisum on Patents* 18-352 (citing cases that define "select" as both to choose among several and, simply, to choose). However, as the Federal Circuit has repeatedly emphasized, the key to claim construction is to look at the claim term within the context of the entire patent. *See, e.g.*, *Phillips*, 415 F.3d at 1321 ("Properly viewed, the 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent."). In context, I find that the phrase "selected ratio" must mean a ratio that can be picked from a range of settings.

The patent discloses that the "principal object" of the invention is to provide a control system for synchronizing liquid and granular feed rates "wherein the feed rate of a liquid delivery system can be *selectively set* to a constant *within a range* of the synchronized feed rate established by an interconnected granular delivery system." '125 Patent col. 2 ll. 28-33 (emphasis added). In other words, the principal object of the invention contemplates an adjustable liquid feed rate. No other clause in claim 15 relates to this adjustment. *See id.* col. 13 ll. 1-27. Thus, unless the phrase "selected ratio" indicates a way to perform this adjustment, claim 15 would not accomplish the patent's principal purpose.

Moreover, although not used in an entirely consistent way, most references to the word "select" or "selected" in the specification indicate adjustability or choice in a range. *See, e.g.*, *id.* col. 2 ll. 66-68 ("The liquid feed rate may be changed by a flow control valve, which returns a selected portion of liquid to the storage tank.") (emphasis added); col. 3 ll. 18-22 ("Where the granular feed rate is otherwise reduced by the connection to and activation of the liquid delivery system, the operator still can vary the respective feed rates within a range. The operator can select the correct material mix to control road conditions."); Col 5 ll. 1-5 ("The liquid flow control valve 42 returns a selected amount of the liquid 17 to the tank 16. The amount is infinitely variable over a given range and directly determines the feed rate of the liquid 17."). This lends further support to the conclusion that "selected ratio" must mean a dynamic selection. I therefore adopt Bosch's definition and construe the function at issue to be controlling the liquid motor in a way that permits adjustment of the liquid material feed rate and thus the liquid to granular ratio. A fixed ratio is not covered.

With the function identified, I next consider what structures correspond to that function. There are two such structures disclosed. The first uses a flow control valve [48] upstream of the liquid motor [38] to control the amount of hydraulic fluid flowing to that motor:

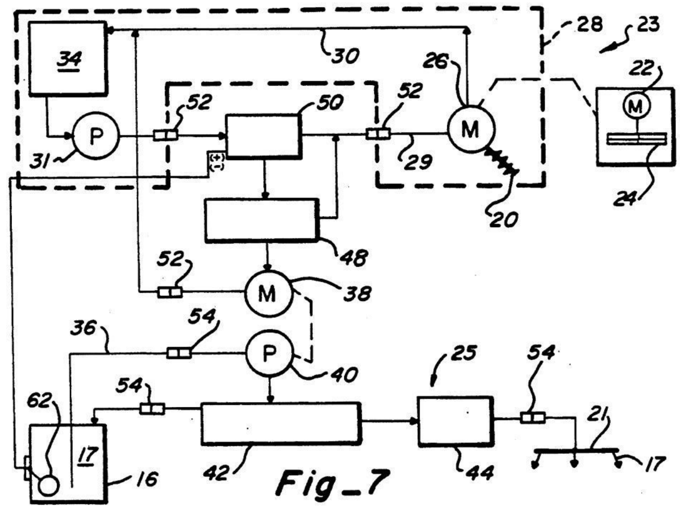



Fig_7

By regulating hydraulic fluid, this valve allows for control of the power and speed of the liquid motor. The structure also uses a liquid flow control valve [42] in the liquid system, which adjusts the amount of liquid dispersed and thus permits manipulation of the liquid to granular ratio. *See* '125 Patent col. 6 l. 65 - col. 7 l. 28.[12]

The second structure is illustrated at Figure 9:

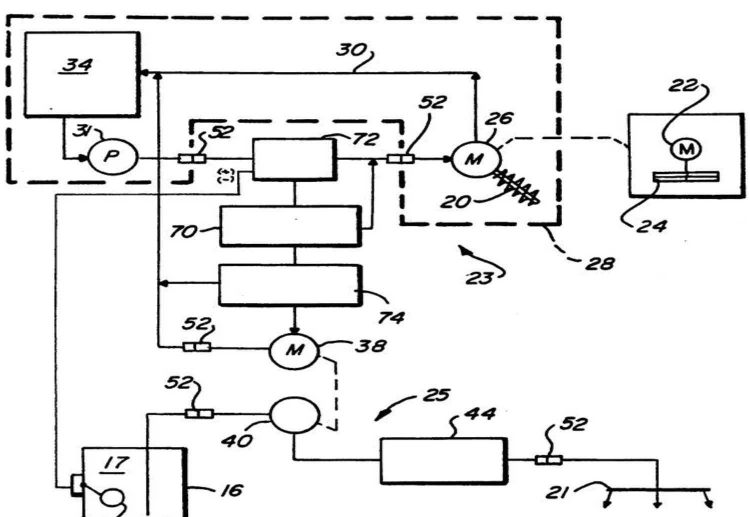



Fig_9

[12] Again, Figure 8 is substantially the same as Figure 7, except the positions of the direction [50] and flow control [48] valves are reversed. *See* Sec. III.A.2.b, *supra*.

Like the previous structures, this structure uses a hydraulic flow control valve [70] to regulate the power flowing to the liquid motor. However, instead of using a liquid flow control valve to regulate the flow of liquid material, this structure uses a second hydraulic flow control valve [74] to perform that function. *See id.* col. 7 l. 41 - col. 8 l. 34. As both of these structures allow for control of the liquid motor speed and adjustment of the liquid to granular ratio, they adequately correspond to the function in question.

Bristol points to several other structures that, it claims, perform this liquid motor control function. *See* '125 Patent Claim 15 Chart at 7. Bristol contends that the hydraulic system pump controls the speed of the liquid system motor, referencing specifically Figure 5 of the patent. Bristol also argues that Figure 6 shows a direction control valve regulating the liquid motor speed. Lastly, Bristol cites to Figure 10 as accomplishing this function. The problem, however, is that these structures do not permit adjustment of the liquid to granular ratio. Rather, each structure operates with a fixed amount of power flowing to the granular and liquid system motors, and thus with a fixed ratio of liquid and granular material. *See* '125 Patent col. 6 ll. 1-12 ("In the embodiment shown in FIG. 5, . . . [t]he hydraulic fluid flow in the line 29 is used by the motor 38 to establish a rotary motion to turn the pump 40 of the liquid delivery system 25. The hydraulic flow in the line 29 also powers the conveyor 20 through the separate conveyor motor 26."); *id.* col. 6 ll. 33-41 ("In the embodiment shown in FIG. 6, . . . [t]he conveyor motor 26 receives the fluid flow either directly or through the liquid system motor 38 . . . ."); *id.* col. 9 ll. 45-61 ("[I]n the embodiment shown in FIG. 10 . . . [a] proportional amount of hydraulic fluid is . . . directed to the liquid and conveyor motors 38 and 26 and the remaining and proportional amount of hydraulic fluid in the hydraulic system 28 is returned to the reservoir 3 by the variable control valve 82."). These structures do not correspond to both functions – controlling the speed of the motor and manipulating the liquid to granular ratio – as they must.

As its final proposed structure, Bristol again invokes the Figure 10 Alternate Embodiment. But for the reasons discussed above, *see* Sec. III.A.3, *supra*, this alternate embodiment is not disclosed in the patent and therefore cannot be a corresponding structure.

**c. Means for variable reduction**

The last means clause at issue is the "means for variably controlling said first means in response to the activation of said second means, for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second means." '125 Patent col. 13 ll. 22-27. The parties are in agreement as to the function performed. The means here allows the slowing of the speed of the conveyor motor, by a variably selected amount, in response to the activation of the liquid motor, thereby reducing the quantity of granular material by that same selected percent. *See* '125 Patent Claim 15 Chart at 8. The parties similarly agree that the structures illustrated at Figures 7, 8, and 9 accomplish this function. *See id.* As described above, these structures use a direction valve and a flow control valve upstream of the granular conveyor motor to divert an adjustable percentage of hydraulic fluid to the liquid system, thereby performing variable reduction. *See* Sec. III.A.2.e.i, *supra*.

The parties disagree over whether certain other structures are sufficiently connected to this variable reduction function. These arguments are essentially a recycling of arguments made with respect to claim 1's variable reduction function, and yield similar results here. For example, Bristol contends that the structure illustrated in Figure 10, which diverts hydraulic fluid back to the hydraulic reservoir rather than to the liquid system, performs variable reduction. *See* '125 Patent Claim 15 Chart at 8. Bosch responds, as it did with respect to claim 1, that this figure does not accomplish *both* variable reduction *and* the selection of a liquid to granular ratio. *See* Bosch Br. at 35-36. But like the claim 1 variable reduction clause, nothing in the claim 15 variable reduction clause requires this second, ratio selection function. Rather, the ratio selection occurs with respect to the previous function – control of the liquid motor speed. Therefore, Figure 10 properly accomplishes the function in question. *See* Sec. III.A.2.e.1, *supra*. Bristol also points to the ground speed control system and liquid flow rate sensor that it referenced in connection with claim 1. As explained in Sec. III.A.2.e.ii, iii, *supra*, neither structure is clearly associated with the variable reduction function. Finally, Bristol once again cites to the Figure 10 Alternate Embodiment that I have already determined is not disclosed. In sum, the only structures disclosed that correspond to this function are the structures illustrated in Figures 7-10, which use direction and flow control valves to divert a selected amount of hydraulic fluid away from the granular conveyor motor upon activation of the liquid system.

## C. Claim 16 of the ’125 Patent

Like claims 1 and 15, claim 16 contains a “control means” clause made up of several subsidiary clauses drafted in “means-plus-function” form. Specifically, claim 16 describes a

> means for controlling said first and second motors [the granular and liquid motors], the improvement in said controlling means comprising
>
> [(1)] means for controlling said first motor as a function of a predetermined amount of granular material to be applied to the surface,
>
> [(2)] means for adjustably controlling said second motor as a function of the amount of granular material to be applied to the surface and a selected ratio of liquid material to granular material, and
>
> [(3)] means for variably controlling said first motor in response to the activation of said second motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second motor.

’125 Patent col. 13 l. 40 - col. 14 l. 11. The parties dispute the construction of those clauses.

### *1. Means for controlling granular conveyor motor*

The first means clause, the “means for controlling said first motor as a function of a predetermined amount of granular material to be applied to the surface,” is functionally identical to the first means clause of claim 15. The parties’ joint claim chart makes clear that they view both clauses to share the same function – to control the speed of the granular conveyor motor. *Compare* ’125 Patent Claim 15 Chart at 5 *with* Joint Claim Construction Statement, ’125 Patent Claim 16 [Docket No. 107-6] (“’125 Patent Claim 16 Chart”) at 4. They further advance precisely the same arguments as to corresponding structure. *Id.* While the clauses do use different language, with claim 15 controlling the speed of the motor and thus the "quantity per surface area" of the granular material and claim 16 controlling the speed as a function of "a predetermined amount of granular material," neither party explains, nor do I perceive, a substantive difference between the two. As the parties do not suggest a distinction, I will not strain to find one. I construe this clause to have the same function and corresponding structures as defined in connection with claim 15.

#### ***2. Means for controlling liquid motor***

The second means clause at issue is the "means for adjustably controlling said second motor as a function of the amount of granular material to be applied to the surface and a selected ratio of liquid material to granular material." '125 Patent col. 14 ll. 2-6. This clause closely tracks the second means clause of claim 15, the primary difference being claim 16's use of the phrase "adjustably controlling" instead of claim 15's simple "controlling." However, there is no obvious difference in these two phrases. As noted earlier, "controlling the speed" necessarily implies some ability to adjust – to increase or to decrease – that speed. *See* Sec. III.B.2.a, *supra*. While the doctrine of claim differentiation suggests that different phrases define different things, this doctrine is "a guide, not a rigid rule." *Curtiss-Wright Flow Control Corp.*, 438 F.3d at 1381. Indeed, "claim drafters can also use different terms to define the exact same subject matter," leading the Federal Circuit to caution that courts must not use the doctrine of claim differentiation to broaden claims beyond their correct scope. *Id.* at 1380-81. Here, if "adjustably controlling" in claim 16 meant something different than "controlling" in claim 15, claim 15's function would have to mean simply activating the liquid motor without adjusting it. This would mean that the liquid motor control function in claim 15 would not require anything more than an “on/off” switch. Such a reading stretches this function beyond the common sense idea of “control,” at least in the context of the patent. Particularly in light of the fact that the parties’ joint claim construction chart advances nearly identical definitions and arguments with respect to these means clauses, *compare* ’125 Patent Claim 15 Chart at 7 *with* ’125 Patent Claim 16 Chart at 6, I do not find a substantive distinction between the two.

Moreover, even assuming there was a difference between the clauses, such a difference would not yield additional corresponding structures. As explained above, the reason that the only disclosed structures are those illustrated in Figures 7-9 is that the other structures identified in the specification fail to include the ability to adjust the liquid to granular ratio. *See* Sec. III.B.2.b, *supra*. “Control” versus “adjustable control” of the liquid motor has no bearing on this additional ratio adjustment requirement.

### *3. Means for variable reduction*

The third means clause is a “means for variably controlling said first motor in response to the activation of said second motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second motor.” This clause tracks almost precisely the language of claim 15. The only difference is that claim 15 refers to the first and second “means,” while claim 16 refers to the first and second “motor.” *Compare* ’125 Patent col. 13 ll. 22-27 (claim 15) *with id.* col. 14 ll. 6-11 (claim 16). But it is undisputed that the first and second “means” in claim 15 refers to the granular and liquid motors. *See* ’125 Patent Claim 15 Chart at 5, 7. As the language is essentially identical, I once again adopt the same function identification and corresponding structures described in connection with claim 15.

### D. Claim 17 of the ’125 Patent

The final claim at issue in the ’125 Patent, claim 17, describes a control means comprising

> [(1)] means for proportioning the flow of pressure fluid to said first and second fluid pressure motors as a function of a selected amount of granular material to be applied to the surface and a selected ratio of granular material to liquid material to be applied to the surface, and
>
> [(2)] means for variably controlling said first fluid pressure motor in response to the activation of said second fluid pressure motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second fluid pressure motor.

’125 Patent col. 14 ll. 30-41. The parties debate the meaning of both clauses.

#### *1. Means for proportioning*

Turning first to the identification of the function, I find it best to take this clause in parts. The first piece, a “means for proportioning the flow of pressure fluid to said first and second fluid pressure motors,” has a clear and common-sense meaning. There is nothing indicating that “proportioning” means anything specific in the hydraulic arts, and thus I look to its widely accepted meaning, which is simply to “adjust (a part or thing) in size relative to other parts or things.” Merriam-Webster’s Collegiate Dictionary 997 (11th ed. 2007). In the context of the patent, “pressure fluid” clearly means the hydraulic fluid repeatedly discussed. And “first and second fluid pressure motors,” again read in context, reference the granular conveyor motor and the liquid system motor, *see* ’125 Patent col. 14 ll. 24-25, both of which are described in the specification as hydraulically-powered. *See id.* col. 4 ll. 17-18 (noting that the "hydraulic system . . . operates the conveyor 20 via a conveyor motor 26"); *id.* col. 4 ll. 63-65 (noting that, in a hydraulic embodiment, the liquid system motor "is in fluid communications with the hydraulic system"). Thus, the initial portion of this clause describes a function of adjusting the flow of hydraulic fluid between the liquid and granular motors.

The concluding portion of the clause recites that the proportioning occurs as a function of both (1) "a selected amount of granular material" and (2) "a selected ratio of granular material to liquid material." These are precisely the same qualifiers articulated in claim 15 and 16's liquid motor control means. Bristol again argues that the function does not require the ability to *adjust* the liquid to granular ratio. Bristol Reply at 45. For the reasons already discussed, I cannot adopt this interpretation. I construe these qualifiers to mean that in proportioning, i.e., adjusting hydraulic flow, one must be able to manipulate the amount of liquid material and thus choose a ratio of liquid to granular. *See* Sec. III.B.2.b, *supra*.

With the function so defined, I turn to the identification of corresponding structures. As with the liquid motor control clause of claims 15 and 16, the parties are in agreement that the structures illustrated as Figures 7, 8, and 9 accomplish the function. *See* Joint Claim Construction Statement, '125 Patent Claim 17 [Docket No. 107-2] ("'125 Patent Claim 17 Chart") at 5. Again, these structures perform the proportioning function in two different ways. The first uses a hydraulic flow control valve upstream of both motors to proportion the flow and a liquid flow control valve in the liquid material system to permit adjustment of the liquid rate. *See* Sec. III.B.2.b, *supra*. The second uses two hydraulic flow control valves, the first to proportion the flow and the second to adjust the liquid rate. *See id.* In other words, the structures perform the proportioning function of claim 17 in the same way they perform the liquid motor control function of claims 15 and 16 – they split hydraulic fluid between the two motors and then permit additional manipulation of the liquid rate further downstream.

Bristol points to other structures, which are essentially the same structures it argued with respect to the liquid motor control function of claims 15 and 16. *Compare* ’125 Patent Claim 15 Chart at 7 (proposing Figure 5, 6, 10, and Figure 10 Alternate Embodiment) *with* ’125 Patent Claim 17 Chart at 5 (same). For the reasons already discussed, these structures either fail to allow for manipulation of the liquid material rate (for the structures associated with Figure 5, 6, and 10) or are simply not disclosed (for Figure 10 Alternate Embodiment) and therefore cannot constitute corresponding structures. *See* Sec. III.B.2.b, *supra*.

#### ***2. Means for variable reduction***

The second means clause, “means for variably controlling said first fluid pressure motor in response to the activation of said second fluid pressure motor for reducing the quantity of granular material applied to the surface by a selected percentage of the material quantity applied prior to the activation of said second fluid pressure motor,” is nearly identical to the variable reduction means clauses in claims 15 and 16. The only difference is the description of the motors; claim 15 references the first and second “means,” claim 16 references the first and second “motor,” and claim 17 references the first and second “fluid pressure motor.” *Compare* ’125 Patent col. 13 ll. 22-27 (claim 15), *id.* col. 14 ll. 6-11 (claim 16), *and id.* col. 14 ll. 35-41 (claim 17). As already discussed in connection with claim 16, these are distinctions without differences. Each clause describes the slowing of the speed of the conveyor motor by a variably selected amount in response to the activation of the liquid system, thereby reducing the quantity of granular material by that same selected percent. I adopt the same function identification and corresponding structures described in connection with claim 15, above.

### E. Claim 3 of the ’396 Patent

With respect to the ’396 Patent, the parties focus their dispute on three discrete issues: (1) whether the “ground speed computer” and the “material computer” described in the patent can be combined into one device; (2) whether the two “signals” generated by those computers must be separate and discrete; and (3) what the patent means when it refers to “control” of the liquid system. *See* Bosch Br. at 47-53; Bristol Reply at 50-57; *see also Markman* Hearing Trans. at 88-89. Although the parties’ claim construction charts raise these issues with respect to numerous claim elements, *see generally* Joint Claim Construction Statement, ’396 Patent Claim 3 [Docket No. 107-4] (“’396 Patent Claim 3 Chart”), in their briefs and their arguments during the *Markman* hearing, they emphasized that these are the questions to be resolved. Therefore, I address each issue generally, without necessarily discussing each and every claim element that has been called into dispute.

#### *1. Separate signals*

The basic invention disclosed in the ’396 Patent is an improvement in the controls for synchronizing the liquid and granular material rates encompassed in the ’125 Patent, that improvement being the use of computers to adjust the rates. *See* '396 Patent col. 1 ll. 58-61, col. 10 ll. 26-31. Claim 3 describes, among other things, a material computer that has a means for generating two signals. The first is "a function of [the] sensed vehicle speed" and is "direct[ed] . . . to [the] ground speed computer for controlling the delivery of said granular material." *Id.* col. 12 ll. 65-67, col. 13 ll. 2-4. The second is "a function of [the] sensed conveyor speed" and is "direct[ed] . . . to [the] liquid material delivery[ ] apparatus for controlling the delivery of liquid material." *Id.* col. 12 l. 68 - col. 13 l. 2, col. 13 ll. 5-7. Bosch argues that these are "two entirely separate signals with different origins and different functions," but contends that Bristol's experts have opined that only one signal is necessary. Bosch Br. at 48. In response, Bristol clarifies that it is not disputing that two signals are required, but rather is advancing an equivalence argument, i.e., that Bosch's products perform a function equivalent to this second signal. Bristol Reply at 51. As equivalence is not part of the claim construction process, I do not address this argument here. Rather, I agree with the conceded notion that claim 3 requires two separate signals, the first of which is a function of the vehicle speed, and the second a function of the conveyor speed.

### *2. Combined computers*

Claim 3 also references both a "ground speed computer" and a "material computer." The parties dispute whether these devices can be combined. Bosch notes, correctly, that in claim 3 itself, the two computers are referenced separately. *See* '396 Patent col. 12 ll. 46-57 (discussing a "ground speed computer"), col. 12 l. 62 - col. 14 l. 7

(discussing a "material computer"). However, the specification explains that these two systems may be integrated:

> An improved control system 100 for the spreader is shown in FIGS. 11, 12a, 12b and 12c. This control system 100 includes a material computer 102 which may either utilize the existing ground speed control 104 *or replace it*. Ground speed control is known in the prior art and is used to adjust the speed of the conveyor 20 according to the speed of travel of the vehicle 12 carrying the aggregate conveyor 20 and the actual conveyor speed. As shown in FIGS. 11 and 12, the ground speed control 104 is *incorporated into* or associated with the material computer 102 of the improved delivery system 100.

*Id.* col. 9 l. 63 - col. 10 l. 15 (emphasis added). As the specification is the "single best guide" – indeed, usually a "dispositive" one – for determining the meaning of a disputed claim, *Phillips*, 415 F.3d at 1315, this language compels the conclusion that the functions of the two computers may be merged.

Notwithstanding the specification, Bosch advances several arguments for why the devices must be held separate. For example, it contends that the "material computer" sends signals to the "ground speed computer" and vice versa. Bosch Br. at 51, *see also* '396 Patent col. 12 l. 46 - col. 13 l. 4 (noting the ground speed computer "sens[es] vehicle speed and generat[es] a vehicle speed signal," the material computer "receiv[es] said vehicle speed signal and generat[es] a first signal as a function of said sensed vehicle speed," and then the material computer "direct[s] said first signal to said ground speed computer for controlling the delivery of said granular material"). That is certainly true. But Bosch does not explain – and I fail to see – why it matters whether that signal is sent between two different "boxes" or, instead, between two different portions of the same device. Bristol does not contend that the *functions* of the ground speed computer can be absent, only that those functions can be, in the words of the specification, “incorporated into” the material computer device. *See* Bristol Br. at 37 (“[O]ne can substitute a single CPU for two computers containing two CPUs if the single CPU is programmed to perform all of the functions of the two CPUs.”). Given the plain language of the specification, I cannot find that this signal transfer reference requires two physically separate devices.

Bosch also argues that Bristol knew how to make clear when the material computer performed a function directly, rather than performing it through the intermediary of a separate ground speed computer, because it did so in other places in the claim. Bosch Br. at 51; *see also* ’396 Patent col. 13 ll. 5-8 (explaining that the material computer sends the “second signal,” discussed above, directly to the liquid material delivery apparatus). Bosch misapprehends Bristol’s position. Bristol is not arguing that, by combining the two computers, the functions of the ground speed computer disappear and thereby the steps of sending signals through the “ground speed computer” are eliminated. Rather, Bristol argues that, in the combined structure, that signal exchange occurs in one closed system. *See* Bristol Reply at 57 (“In the one computer scenario, a first portion of the computer mother board senses the vehicle speed and generates a vehicle speed signal that is transmitted to a second portion of the mother board, which uses this vehicle speed signal to generate a first signal that it sends back to the first portion of the motherboard.”). There is nothing inherently wrong with this contention. In short, given that the patent clearly explains that the ground speed controller’s functions may be incorporated into the material computer, I am bound to construe the patent’s claim terms to mean precisely that.

### *3. Control of the liquid system*

The parties' final dispute involves claim 3's disclosure that the "second signal" sent from the material computer to the liquid delivery system – the signal linked to conveyor speed – "control[s]" that system. *See* '396 Patent col. 13 ll. 5-8 (explaining that the material computer "direct[s] said second signal to said liquid material delivery[ ] apparatus *for controlling the delivery of liquid material thereby*") (emphasis added). Bosch contends that this requires dynamic control, while Bristol argues that a signal simply turning the liquid system "on" or "off" is within the scope of the patent. Bosch Br. at 49-50; Bristol Reply at 51-52. On this point I must agree with Bosch. While "control" could, perhaps, mean simply "activating," the context of the '396 patent makes clear that something more is required. *See Phillips*, 415 F.3d at 1321 ("The 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent."). The specification repeatedly describes the material computer as dynamically manipulating the liquid system:

> [T]he improved embodiment shown in FIG. 11 controls the liquid material feed rate electronically by programming the material computer 102 as a function of the granular material feed rate. The material computer sets the speed at which liquid pumps 40 are driven by a liquid system motor (not shown). For any given granular material feed rate, the liquid feed rate may be changed by manually setting the material computer 102.

'396 Patent col. 10 ll. 27-35.

> As determined by the speed of the conveyor 20, the material computer 102 controls the speed at which the pumps 40 feed the liquid 17 from the liquid supply tank 16 to the spray nozzles 21.

*Id.* col. 10 ll. 42-45.

> The modified control system shown in FIG. 12c is similar to that shown in FIG. 12b, with the exception that the ground speed computer 104 output signal is transmitted to the material computer 102, which then directly controls the speed of the aggregate conveyor 20 and liquid feed.

*Id.* col. 11 ll. 6-11. Moreover, the specification explains that the material computer *both* activates *and* controls the liquid system, further indicating that "control" must mean something more than simply "activating." *See id.* col. 10 ll. 61-63 ("The material computer 102 further activates and controls the liquid material system by generating and transmitting a control signal thereto."); col. 11 ll. 4-5 ("The material computer also generates a signal which is used to activate and control the liquid delivery."). For all of these reasons, I find that claim 3's disclosure of the "control" of the liquid system, read in context, means dynamic control and not simply activation.

## IV. CONCLUSION

Claims 1, 15, 16, and 17 of the '125 Patent, and claim 3 of the '396 patent, are construed as outlined above.

DATED February 1, 2010.

BY THE COURT:

s/Philip A. Brimmer
PHILIP A. BRIMMER
United States District Judge