United States District Court,
S.D. Indiana, Indianapolis Division.

LAWLER MANUFACTURING CO INC,
Plaintiff.
v.
BRADLEY CORPORATION and Kevin B. Kline,
Defendants.

No. IP98-1660-C-M/S

Nov. 30, 2000.

ORDER ON PLAINTIFF'S MOTION FOR CLAIM CONSTRUCTION

McKINNEY**.**

Lawler Manufacturing Co., Inc. ("Lawler") filed this action against Bradley Corporation ("Bradley") and Kevin B. Kline ("Kline") (collectively "Bradley") alleging, among other things, infringement of two Lawler patents for thermostatic mixing valves. On April 26, 2000 this Court issued an order on Lawler's motion for preliminary injunction. Order on Motion for Preliminary Injunction, Apr. 26, 2000 ("Prelim.Inj.Order"). In the Preliminary Injunction Order the Court denied Lawler's motion with respect to Bradley's EFX8 (2000), EFX25 (2100), EFX60 (2200) emergency valves pursuant to its United States Patent 5,647,531 (the " '531 Patent") infringement claim because Lawler had not shown a likelihood of success on the merits of that claim. In addition, the Court granted the injunction with respect to Bradley's HL80 (3080), HL130 (3130), HL200 (3200) high-low valves and on the EFX60 (2200) emergency valve pursuant to Lawler's United States Patent 5,323,960 (the " '960 Patent") infringement claim. The Court undertook a preliminary analysis of the disputed claim terms for purposes of the preliminary injunction. Subsequently, Lawler filed a motion to reconsider the Court's Preliminary Injunction Order with respect to the '531 Patent. The Court granted Lawler's request with respect to infringement by one of Bradley's valve designs. Mem. Op. & Order on Mot. To Recons., July 12, 2000, at 2-6.

On September 6, 2000, Lawler filed a motion for claim construction of the patents in suit. Pl.'s Mot. for Claim Constr. at 1. In response to Lawler's motion, Bradley reasserted the same arguments it had during the preliminary injunction phase of the suit, but also raised interpretation issues about additional terms. Because the Court had based the claim construction of the patent terms in dispute during the preliminary injunction phase on a limited record and because the parties have filed cross motions for summary judgment that would necessitate further claim construction analysis, the Court ordered that a hearing be held on the claim construction issues. The parties offered additional evidence and argument at a hearing on October 26, 2000 that specifically focused on construction of the disputed terms. Guided by the Supreme Court's opinion in Markman v. Westview Inst., Inc., 517 U.S. 370, 388-90 (1996) (" *Markman II* "), and by the Federal Circuit's opinion in Markman v. Westview Inst., Inc., 52 F.3d 967 (Fed.Cir.1995) (" *Markman I* "), the claim construction rendered herein will not be a "tentative one" subject to change upon receipt of additional information and evidence, but a definitive one based on all of the evidence of record at this point in the litigation. *See* International Comm. Mat'ls, Inc. v. Ricoh Co., Ltd., 108 F.3d 316, 318-19 (Fed.Cir.1997) (noting that district court performed a "tentative construction" of the claim language to facilitate a decision of the preliminary injunction issue). Having been fully advised by the parties of their relative positions, the Court now turns to a discussion of the relevant legal rules and to application of those rules to the patents in

dispute.

I. *STANDARDS*

A. Claim Construction

When construing patent claims, a court must determine the meaning of the language used before it can ascertain the scope of the claims the plaintiff alleges are being infringed. *See* Markman I, 52 F.3d at 979. In doing so, the court's interpretive focus is not the subjective intent of the parties employing a certain term, but the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean. *See* id. at 986. When the court undertakes its duty of construing the claims, it first must look to the intrinsic evidence: the asserted and unasserted claims, the specification, and the prosecution history. *See* Desper Prods. Inc. v. QSound Labs, Inc., 157 F.3d 1325, 1333 (Fed.Cir.1998) (citing Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1581 (Fed.Cir.1996)); Markman I, 52 F.3d at 979. Most of the time, such evidence will provide sufficient information for construing the claims. *See* Vitronics, 90 F.3d at 1583.

The patent claims should " 'particularly point out and distinctly clai[m] the subject matter which the applicant regards as his invention.' " Markman II, 517 U.S. at 373 (citing 35 U.S.C. s. 112). During claim construction, the appropriate starting point for the court's inquiry is always the words of both the asserted and unasserted claims. *See* Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed.Cir.1999); Comark Comms., Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed.Cir.1998); Vitronics, 90 F.3d at 1582; *see also* Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1248 (Fed.Cir.1998). It is the claims, not the written description, that define the scope of the patent and accordingly, the patentee's rights. *See* Laitram Corp. v. NEC Corp ., 163 F.3d 1342, 1347 (Fed.Cir.1998); Markman I, 52 F.3d at 970-71. As the Federal Circuit has recently noted, "[c]ommon words, unless the context suggest otherwise, should be interpreted according to their ordinary meaning." Desper Prods., 157 F.3d at 1336 (citing York Prods., Inc. v. Central Tractor Farm & Family Ctr., 99 F.3d 1568, 1572 (Fed.Cir.1996)). *See also* Renishaw, 158 F.3d at 1249. Further, when there are several common meanings for a term, "the patent disclosure serves to point away from the improper meanings and toward the proper meaning." Renishaw, 158 F.3d at 1250. *Accord* Desper Prods., 157 F.3d at 1336 (stating that the context of the claims can be found in the specification and drawings).

A claim term will not be given a common dictionary meaning, however, if such a reading would be nonsensical in light of the patent disclosure, or specification. *See* Renishaw, 158 F.3d at 1250. Accordingly, the correct claim construction is also the one that "stays true to the claim language and most naturally aligns with the patent's description of the invention." *Id*. That description, or specification, serves an important purpose. In it, the patentee must provide a written description of the invention that would allow a person of ordinary skill in the art to make and use the invention. *See* Markman I, 52 F.3d at 979. The applicable statute requires that "[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains ... to make and use the same...." 35 U.S.C. s. para. 112, para. 1. Thus, to discover the correct meaning of a disputed claim term, the court must refer to the specification's description of the invention.

In addition, a patentee may be his or her own lexicographer and use terms in a manner different from their ordinary meaning. *See* Vitronics, 90 F.3d at 1582. If the patentee chooses to do that, he or she must clearly state the special definition in the specification or file history of the patent. *See id*. The specification then serves as a dictionary when it defines terms, either expressly or by implication, that are used in the claims. *See id*. Therefore, it is also important to review the specification to discern whether the patentee has used a term in a way that is inconsistent with its ordinary meaning. *See id*. However, the specification should be used to clarify unclear claim terms, not to "trump the clear meaning of a claim term." Comark, 156 F.3d at

1187 (citing E.I. du Pont de Nemours & Co. v. Phillips Petroleum, 849 F.2d 1430, 1433 (Fed.Cir.1988)).

Claims must be read in light of the specification. *See* Markman I, 52 F.3d at 979. However, limitations from the specification may not be read into the claims. FN1 *See* Comark, 156 F.3d at 1186; *see also* Laitram, 163 F.3d at 1347. In particular, the court should not limit the invention to the specific examples or preferred embodiment found in the specification. *See* Texas Instruments, Inc. v. United States Int'l Trade Comm'n, 805 F.2d 1558, 1563 (Fed.Cir.1986); *see also* Comark, 156 F.3d at 1186. Thus, the "repetition in the written description of a preferred aspect of a claim invention does not limit the scope of an invention that is described in the claims in different and broader terms." Laitram, 163 F.3d at 1348. *See also* Electro Med. Sys. v. Cooper Life Scis., Inc., 34 F.3d 1048, 1054 (Fed.Cir.1994).

FN1. As will be discussed further, an exception to this rule applies when the claim is written in a means- or step-plus-function format under 35 U.S.C. s. 112, para. 6.

Interpreting the meaning of a claim term "is not to be confused with adding an extraneous limitation appearing in the specification, which is improper." Laitram, 163 F.3d at 1348 (quoting Intervet Am., Inc. v. Kee Vet Lab., Inc., 887 F.2d 1050, 1053 (Fed.Cir.1989)). An extraneous limitation is a limitation added "wholly apart from any need to interpret what the patentee meant by particular words and phrases in the claim." Hoganas AB v. Dresser Indus., Inc., 9 F.3d 948, 950 (Fed.Cir.1993). *See also* Renishaw, 158 F.3d at 1249. Although there is a fine line between reading a claim in light of the specification and reading a limitation from the specification into the claim, the court must look cautiously to the specification for assistance in defining unclear terms. *See* Comark, 156 F.3d at 1186-87.

The third source of intrinsic evidence is the patent's prosecution history. *See Desper Prods.,* 156 F.3d at 1336-37; Vitronics, 90 F.3d at 1582. "Prosecution history is an important source of intrinsic evidence in interpreting claims because it is a contemporaneous exchange between the applicant and the examiner." Desper Prods., 157 F.3d at 1336-37. In a patent's prosecution history the court will find a complete record of the proceedings before the Patent and Trademark Office leading to issuance of the patent. *See* Vitronics, 90 F.3d at 1582. The prosecution history contains both express representations made by the patentee concerning the scope of the patent, as well as interpretations of claim terms that were disclaimed during the prosecution. *See* id. at 1582-83; *see also* Southwall Tech Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.), *cert. denied,* 516 U.S. 987 (1995). Although the prosecution history is useful for understanding claim language, it "cannot enlarge, diminish, or vary the limitations in the claims." Markman I, 52 F.3d at 979 (quotations omitted).

In some cases, it may be necessary for the court to consult extrinsic evidence to aid it in construing the claim language. *See* Pitney Bowes, 182 F.3d at 1308; Vitronics, 90 F.3d at 1584. Extrinsic evidence is any evidence outside of the patent and prosecution history, "including expert and inventor testimony, dictionaries, and learned treatises." Markman I, 52 F.3d at 980. *See also* Pitney Bowes, 182 F.3d at 1308. It may be used to assist the court's understanding of the patent, or the field of technology. *See* Markman I, 52 F.3d at 980-81. However, "courts [should] not *rely* on extrinsic evidence in claim construction to contradict the meaning of claims discernible from thoughtful examination of the claims, the written description, and the prosecution history-the intrinsic evidence." Pitney Bowes, 182 F.3d at 1308 (citing Vitronics, 90 F.3d at 1583). Judges are not usually "conversant in the particular technical art involved," or capable of reading the patent specification and claims as one skilled in the art might. *See* Markman I, 52 F.3d at 986; *see also* Pitney Bowes, 182 F.3d at 1308-09. Thus, "consultation of extrinsic evidence is particularly appropriate to ensure that [the court's] understanding of the technical aspects of the patent is not entirely at variance with the understanding of one skilled in the art." Pitney Bowes, 182 F.3d at 1309. When the court relies on extrinsic evidence to assist with claim construction, and the claim is susceptible to both a broader and a narrower meaning, the narrower meaning should be chosen if it is supported by the intrinsic evidence. *See* Digital Biometrics v. Identix, 149 F.3d 1335, 1344 (Fed.Cir.1998). It is entirely proper for the court to

accept and admit extrinsic evidence, such as an expert's testimony, to educate itself, but then base its construction solely on the intrinsic evidence. *See Mantech,* 152 F.3d at 1373.

Further, the Federal Circuit has taken special note of the use by courts of a specific type of extrinsic evidence: dictionaries. In its *Vitronics* opinion, the court explained that although technical treatises and dictionaries are extrinsic evidence, judges are free to consult these resources at any time in order to get a better understanding of the underlying technologies. 90 F.3d at 1584 n. 6. The *Vitronics* court stated that judges may rely on dictionaries when construing claim terms as long as the dictionary definition does not contradict the definition found in, or ascertained by, a reading of the patent. *Id.*

B. Section 112***, para. 6***

When construing one of the claim elements in question in the '960 Patent, the Court must use special rules for construing a means-plus-function claim element. When a patentee uses such an element, he or she is subject to the following statutory provision:

[a]n element in a claim for a combination may be expressed as a means ... for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specifications and equivalents thereof.

35 U.S.C. s. 112, para. 6. *See also* Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1211 (Fed.Cir.1998).

For an element in a means-plus-function format, the "means" term "is essentially a generic reference for the corresponding structure disclosed in the specification." Chiuminatta Concrete Concepts v. Cardinal Indus., 145 F.3d 1303, 1308 (Fed.Cir.1998). *See also* Mas-Hamilton Group, 156 F.3d at 1211 (quoting Chiuminatta Concrete Concepts, 145 F.3d at 1308). By using this format, a patentee is allowed to claim a function without expressing all of the possible means of accomplishing that function. *See* O.I. Corp. v. Tekmar Co., 115 F.3d 1576, 1583 (Fed.Cir.1997). "The price that must be paid for use of that convenience is limitation of the claim to the means [or acts] specified in the written description and equivalents thereof." *Id.*

Thus, a claim expressed in means-plus-function language constitutes an exception to the rule that prohibits reading limitations from the specification into the claims. *See* Valmont Indus., Inc. v. Reinke Manuf. Co., 983 F.2d 1039, 1042 (Fed.Cir.1993). For example, when dealing with a means-plus-function claim, specific alternative structures mentioned in the specifications, and equivalents thereto, delineate the scope of the patent. *See* Mas-Hamilton Group, 156 F.3d at 1211; Serrano v. Telular Corp., 111 F.3d 1578, 1583 (Fed.Cir.1997). The alternative structures must be specifically identified, not just mentioned as possibilities, in order to be included in the patent's scope. *See* Fonar Corp. v. General Elec. Co., 107 F.3d 1543, 1551 (Fed.Cir.), *cert. denied,* 522 U.S. 908 (1997).

II. ***DISCUSSION***

In the present motion, Lawler seeks a definitive statement from the Court on the definitions of several terms that appear in either its '531 Patent or its '960 Patent. The Court will address the disputed terms in each patent in turn.

A. THE '531 PATENT

Lawler's '531 Patent describes a "thermostatic control valve system for use in emergency shower and eyewash systems." '531 Patent, Title. The invention was developed to provide tempered water for emergency applications. '531 Patent, col. 1, *ll.* 7-8; 48-50. Several problems with prior valves were addressed with the '531 Patent valve system. Those included providing an uninterrupted stream of fluid for

a minimum time period, providing tempered water (described as a range between 65 (deg.) and 95 (deg.) F) "regardless of extreme fluctuations in the supply of hot or cold water," and accounting for failures in the supply of hot or cold water and for failure of the thermostat without putting the user in greater danger. Id. col. 1, *ll*. 55-67; id. col. 2, *ll* . 1-8. The '531 Patent invention solves the later problem by continuing to supply cold water at the desired flow rate even when the hot water fails or when the thermostat fails; therefore, if either of those failures occur the user will still be doused with fluid at the recommended flow rate. Id. col. 9, *ll*. 61-67; id. col. 10, *ll*. 1-37; id. col. 10, *ll*. 38-51. In addition, when the cold water fails, the thermostatic mixing valve will shut off the hot water supply to avoid scalding the user. Id . col. 11, 14-24.

Although the '531 Patent describes more than one valve assembly, Lawler and Bradley have focused on the terms in claim 6. Claim 6 states in full:

6. A thermostatic mixing valve comprising:

a housing defining a liquid chamber;

a thermally responsive control member disposed within said liquid chamber and having an actuator operable in response to the temperature of liquid within said liquid chamber;

a hollow valve liner defining a number of *apertures* in communication with a first source of relatively colder liquid and *defining a first bore* in communication with a second source of relatively hotter liquid, said liner *further defining a shuttle bore in fluid communication* between said liquid chamber and said number of apertures and said first bore; and

a shuttle valve disposed within said shuttle bore and operably coupled to said actuator, said shuttle valve configured to variably restrict the flow of liquid through said first bore in response to movement of said thermostat actuator without restricting the flow of liquid through said number of apertures.

Id. col. 14, *ll*. 1-19 (emphasis added). The terms in dispute include "a number of apertures," "a hollow valve liner ... defining a first bore," and "in fluid communication." These terms were also disputed by the parties at the preliminary injunction stage of the proceedings. However, at the *Markman* hearing Bradley presented no additional evidence in support of its position on the terms "a number of apertures" and "a hollow valve liner ... defining a first bore." Lawler asserts that by failing to respond to the claim construction issues it raised, Bradley has tacitly conceded those issues, therefore the Court must construe the claims as modified by Lawler. But, Bradley did not "fail to respond" to the issues Lawler raised in its motion for claim construction, Bradley just chose to rely upon the arguments it made at the preliminary injunction phase of this suit. Defs.' Resp. in Opp'n to Pl.'s Mot. for Claim Constr., at 1 & n. 1 ("Defs.' Opp'n to Claim Constr."). In addition, Bradley did present some argument at the *Markman* hearing about the phrase "in communication." Therefore, the Court must, at least briefly, revisit all the disputed terms in the '531 Patent, claim 6.

1. "*A Number of Apertures*"

In the preliminary injunction pleadings, Bradley argued that claim 6 requires more than one set of cold fluid apertures. Defs.' Br. in Opp'n to Pl.'s Mot. for Prelim. Inj. at 44 ("Def.' Prelim. Inj. Opp'n Br."). In fact, Bradley argued that one set of apertures was necessarily located within the shuttle bore (the portion of the valve liner in which the shuttle valve moves, '531 Patent, col. 14, *ll*. 14-15). Defs.' Prelim. Inj. Opp'n Br. at 44 (citing Ballanco Aff. para. 8).

In contrast, Lawler argued that only one set of openings is all that claim 6 requires. Pl.'s Reply Br. in Supp. of Mot. for Prelim. Inj. at 19 ("Pl.'s Prelim. Inj. Reply Br."). Moreover, reading a requirement of two sets of openings, a set of apertures and a set of slots, into claim 6 would render claim 7 superfluous. Therefore,

Lawler argues that pursuant to the doctrine of claim differentiation, claim 6 could not require two sets of apertures. Id. at 20 (citing Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1538 (Fed.Cir.1991)).

The Court agrees with Lawler. There is nothing in the language of the claims or in the specification that requires more than "a number of apertures." Use of the plural form of aperture does imply that more than one aperture should be present, or implies a set of apertures, however, there is nothing that specifies that the number of aperture sets need be more than one. In addition, as Lawler points out, requiring more than one set of apertures in claim 6 would render claim 7 superfluous. Claim 7 states:

The thermostatic mixing valve of claim 6, wherein:

said valve liner defines a number of slots in communication between said first source and said shuttle bore; and

said shuttle valve is configured to variably restrict the flow of liquid through said number of slots into said shuttle bore in response to movement of said thermostat actuator.

'531 Patent, col. 14, *ll*. 20-26. Claim 7 clearly adds a requirement that the valve liner also define a number of slots between the cold liquid source and the shuttle bore. In other words, claim 7 adds a second set of apertures for the cold liquid source. If claim 6 required a second set of apertures, this portion of claim 7 would be repetitive and unnecessary.

Moreover, it appears that Bradley's argument that the specification supports a requirement that the valve described by claim 6 have at least two sets of apertures impermissibly imports a claim limitation from the description of the preferred embodiment. Bradley points to language in column 8 that describes the shuttle valve and its function of closing the cold liquid bypass slots defined by the valve liner. Id. col. 8, *ll*. 4-14. The '531 Patent goes on to describe the cold liquid apertures, also defined by the valve liner. Id. col. 9, *ll*. 20-25. *See also* id. col. 7, *ll*. 46-50 ("Cold liquid apertures 77 are formed around the outer circumference of the liner and communicate directly with the shuttle bore 74. Likewise, cold bypass slots 78 are cut into the liner 70 above the cold liquid apertures 77.") However, this is a description of the preferred embodiment described by the patent. A court will not import a limitation into a claim from the specification absent means-plus-function language. Laitram, 163 F.3d at 1348. There is no such language in claim 6, nor did Bradley argue that the claim was written such that the Court should interpret the claim using a mean-plus-function limitation.

Therefore, the language of claim 6 itself has no requirement that the liner define a set of apertures and a set of slots. Claim 6 only requires that the valve liner define some number of apertures that communicate with the cold liquid chamber and have an orientation relative to the other parts as further described by the claim.

Bradley also appeared to argue at the preliminary injunction stage that apertures in claim 6 were limited to holes. In other words, slots were not apertures. However, the word apertures clearly means opening without limitation on shape. In addition, reading the word in the context of the claims and specification does not require that the apertures be of any particular shape, only that they are in communication with other parts of the valve assembly. For instances, at column 2, lines 53 to 57, the '531 Patent states: "The vane [sic] liner includes a plurality of cold liquid apertures circumferentially disposed around the liner. In one embodiment, the apertures serve as the primary flow path for the cold water to be mixed with incoming hot water." The description also states: "Cold liquid apertures 77 are formed around the outer circumference of the liner and communicate directly wit the shuttle bore." Id. col. 7, *ll*. 46-48. None of this language limits the shape of the apertures to holes.

In one part of the specification, the preferred aperture shape is discussed. The patent states:

Preferably, each of the valve liners 70 includes 6-8 apertures 77 uniformly distributed around the circumference of the valve liner 70. In a specific embodiment, these apertures have a diameter of about 1/8 inch to ensure adequate cold flow at all times.

Id. col. 11, *ll*. 9-13. This part of the description implies that the inventor thought that holes with an 1/8 inch diameter would best perform the function of ensuring adequate cold liquid flow. But, the description of the preferred embodiment was not meant to limit the patent claims. In addition, the patent specification uses apertures and slot interchangeably when describing an alternative embodiment of the invention. The patent states: "In one specific embodiment, only four such apertures are provided so that about two-thirds of the cold flow is provided through the bypass *apertures*. Even in this embodiment, the bypass *slots* can still be shut off by the shuttle valve." Id . col. 12, *ll*. 53-58 (emphasis added).

Finally, as discussed briefly in the Preliminary Injunction Order, the plain meaning of the term apertures is not limited to holes. Prelim. Inj. Order at 47 n. 9. Bradley's expert, Julius Balanco ("Balanco") admitted as much during the preliminary injunction hearing. Prelim. Inj. Hr'g Tr. at 572-73, Ballanco-Cross.

The Court finds that apertures in the context of the '531 Patent means openings of any shape or dimension. This definition includes, but is not limited to, holes and slots.

2. "*A Hollow Valve Liner ... Defining a First Bore In Communication with a Source of Relatively Hotter Liquid*"

At the preliminary injunction hearing, Bradley argued the "in communication" language of claim 6 requires that the first bore and the source of relatively hotter liquid be adjacent. Defs.' Prelim. Inj. Opp'n Br. at 42-43; Prelim. Inj. Hr'g Tr. at 565, Ballanco-Cross. In addition, the language requiring that the liner define a "first bore" and define a "shuttle bore" means that the first bore and the shuttle bore must be two separate bores rather than different sections of the same bore, or just a single annular interior cavity that functions as both a first bore and a shuttle bore. Defs.' Prelim. Inj. Opp'n Br. at 42; Prelim. Inj. Hr'g Tr. at 430, 433, Kline-Direct; id. at 447-48, Kline-Cross.

Lawler disagreed with Bradley's interpretation of "in communication" and with the specific requirements of a liner that defines a first bore and a shuttle bore. At the preliminary injunction hearing, Lawler argued that the phrase in communication meant the same thing as the phrase in fluid communication. Pl.'s Prelim. Inj. Reply Br. at 20-21; Prelim. Inj. Hr'g Tr. at 194, Ovens-Direct. Thus, claim 6 does not require that the first bore be adjacent to the hotter liquid source, only that the part be open to fluid flowing from the hotter liquid source. *See* Prelim. Inj. Hr'g Tr. at 194, Ovens-Direct. In addition, Lawler argued that the '531 Patent contains no restriction on the overlap of the first bore and the shuttle bore. Prelim. Inj. Prelim. Inj. Hr'g Tr. at 193, Ovens-Direct. Without such a restriction in the '531 Patent, Lawler argued, the first bore and the shuttle bore can overlap until they are both the same physical part, so long as that part has the relationships required by the remainder of the claim.

The Court finds that Bradley's definition of in communication that limits the connection of the parts such that they must be adjacent to or directly connected to one another is not supported by the plain meaning of the claim language or the specification. In common usage, communication can occur directly or indirectly, for example, by face-to-face conversation or by tape-recorded-voice-to-person. In the context of the '531 Patent, the purpose of which is to allow fluid of different temperatures to mix and be controlled to a set degree, there is no reason to limit the communication between various parts of the assembly to direct communication or connection. The important theme is allowing the fluid to flow from one area to another.

Further, the dictionary defines communication as the act of transmitting, connected to or open to. *See, e.g.,* WEBSTER'S THIRD NEW INT'L DICTIONARY 460 (Merriam-Webster Inc.1981). There is nothing in claim 6 or the other claims that limits this definition of communication to a more narrow one requiring that

the parts be "directly open to" or "directly connected to" any other part. The patent specification further supports this finding. The '531 Patent states: "The hot liquid bore opens into the hot liquid chamber so that liquid can be communicated through the bore and up through the shuttle bore of the valve liner." '531 Patent, col. 7, *ll*. 63-67. In the specific embodiment pictured, it appears that the inventor intended that the first bore be directly open into the hot liquid chamber. However, the description of the hot liquid bore suggests that the bore need only be open to the hot liquid chamber such that liquid can move, or be communicated, from the hot liquid chamber into the first bore and from there to the shuttle bore and the mixing chamber. There is no language that limits the shape of the opening from the hot liquid chamber to the area called the first bore, only that the first bore be open to the receipt of hot liquid from the hot liquid chamber.

The Court finds that in communication within the context of the '531 Patent means open to or connected to without limitation on proximity or limitation on the mode of connection.

Furthermore, the Court finds that claim 6 is not limited to valve assemblies that have two distinct bores, a first bore and a shuttle bore; claim 6 is broad enough to encompass a liner that defines a single bore that both communicates with the hot liquid source and is the bore in which the shuttle valve moves. The language of claim 6 that describes the liner also describes the first bore, the shuttle bore and the relationship of those bores to each other and to other parts of the liner. Specifically, claim 6 states: "a hollow valve liner defining a number of apertures ... and defining a first bore ... said liner further defining a shuttle bore...." '531 Patent, col. 14, *ll*. 7-13. Whether claim 6 calls for the first bore and the shuttle bore to be two distinct bores appears to turn on the meaning of the word "further" in the context of the patent. Neither party discussed the meaning of this term. However, the common meaning is in addition or also. "In addition" could connote multiple parts, such as "one after the other." But, claim 6 does not distinctly require multiple parts. The claim only requires a liner that defines a number of apertures and two bores that have specific relationships to each other. The specification does not provide otherwise.

However, there is a difficulty in saying definitively that further means in addition or also and not "one after the other" because the language earlier in the claim used the connector "and" rather than "further." Arguably, the difference is relevant because there was no need to use "further" when "and" would have conveyed "also" as it did earlier in the same claim. Faced with this uncertainty, the Court will look to the extrinsic evidence to help clarify this aspect of claim 6.

The extrinsic evidence supports an interpretation of claim 6 that allows for the first bore and the shuttle bore to overlap. Lawler's expert, Dr. William Ovens ("Dr.Ovens"), specifically stated that the two sections of the liner could overlap because there was no restriction or limitation in the patent that would prohibit such an arrangement. Prelim. Inj. Hr'g Tr. at 193, Ovens-Direct. In addition, Bradley's expert apparently agreed that the patent did not preclude a liner in which a single bore defined both the first bore and the shuttle bore. Id. at 574-76, Ballanco-Cross. In fact, Ballanco testified that faced with the ambiguity in the claim, he issued his opinion on infringement based on either interpretation of claim 6: one that allowed for a single bore and one that required two distinct bores. Id. at 576.

In the context of the '531 Patent and in light of the testimony by both experts, the Court finds that there is no limitation that the first bore and the shuttle bore be distinct bores; the bores may overlap or be a single bore so long as the bores have the relationships required by the remainder of claim 6.

3. "*In Fluid Communication*"

After the preliminary injunction hearing, the Court undertook a claim construction analysis of the phrase in fluid communication. Prelim. Inj. Order at 48-49. In addition, the Court clarified its definition for the phrase in its Memorandum Opinion and Order on Motion to Reconsider ("Reconsideration Order"). Mem. Op. & Order on Mot. to Recons. at 5 ("Recons.Order"). The Court found that the phrase in fluid communication

means "that the parts so delineated communicate through fluid flow; the fluid flowing past one part also flows past the other." Id. at 5.

Lawler asserted in its brief supporting the instant motion that the Court interpreted correctly the phrase in fluid communication. Id. at 5. However, at the *Markman* hearing Lawler reasserted the view that it asserted at the preliminary injunction hearing: in fluid communication means that there is free movement of fluid from one place to another or an open pathway for fluid. In other words, Lawler argues that in fluid communication means an open unimpeded pathway through which fluid may flow, absent external influences. Pls.' Br. in Supp. of Mot. for Claim Constr. at 5-6. In addition, in arguing the claim construction motion, Lawler called the Court's attention to the Federal Circuit's holding in *A.B. Dick Co. v. Burroughs Corp.:*

It is fundamental that one cannot avoid infringement merely by adding elements if each element recited in the claims is found in the accused device. For example, a pencil structurally infringing a patent claim would not become noninfringing when incorporated into a complex machine that limits or controls what the pencil can write. Neither would infringement be negated simply because the patentee failed to contemplate use of the pencil in that environment.

713 F.2d 700, 703 (Fed.Cir.1983), *cert. denied,* 464 U.S. 1042 (1984) (citations omitted). Furthermore, during the *Markman* hearing Lawler admonished that when it construes the claims the Court must keep its focus on the structure of the device as described by claim 6 rather than on the manner in which it works in the environment. *See* Pls.' Br. in Supp. of Mot. on Claim Constr. at 8. Apparently Lawler was under the impression that the Court had construed the phrase in fluid communication with reference to the way the valve works with the addition of a check valve.

In contrast, at the *Markman* hearing, Bradley asserted that it agreed with the Court's interpretation of the phrase in fluid communication from the preliminary injunction proceedings and objected to Lawler's renewed argument as an attempt to seek reconsideration of the Court's preliminary injunction ruling on infringement. The Court agrees with Bradley and finds Lawler's argument directed mainly toward an infringement analysis, which is not the purpose of the present motion. However, given that Lawler has presented additional evidence that the definition of in fluid communication is an open unimpeded pathway through which fluid may flow, absent external influences, the Court will briefly reexamine the intrinsic evidence of the meaning of that phrase.

The Court has already determined that the phrase in communication means open to or connected to without limitation on proximity or limitation on mode of connection. The phrase in fluid communication is used once in the claim language itself and approximately five times, with some modifications, in the remainder of the patent. Specifically, the claim language states: "said liner further defining a shuttle bore in fluid communication between said liquid chamber and said number of apertures and said first bore...." '531 Patent, col. 14, *ll.* 10-13. Because the word fluid modifies communication in the claim, it is logical to conclude that in fluid communication and in communication mean different things. In other words, the word fluid is a limitation on the proximity of the named parts or the mode of connection between the named parts.

In the context of the '531 Patent invention, which is a device that will control the flow and temperature output from hot and cold fluid sources such that it can be used for emergency shower and eyewash systems, in fluid communication apparently means that fluid makes a connection between the named parts or areas of the valve assembly. In other words, fluid is the mode of connection between areas of the valve. This definition is in concert with the use of the phrase in fluid communication in the specification as well.

The specification states that "[t]he thermostatic vanes [sic] each include a valve liner component that is in fluid communication with the cold liquid chamber of the valve body." '531 Patent, col. 2, *ll.* 51-53. Thus, fluid makes a connection between the valve liner component and the cold liquid chamber of the valve body.

It is important to the invention that this be the case because the object of the invention is for the valve assembly to control the temperature and flow of the liquid at the outlet by initially mixing cold and hot liquids within the hollow valve liner. The patent specifically states that the hot and cold liquids are at least initially mixed within the part of the hollow valve liner designated as the shuttle bore. Id. col. 2, *ll*. 59-61.

In addition, the specification states that "the cold liquid inlet 33 communicates with a cold liquid chamber 46 that extends between and in fluid communication with the two valve bores 42, 43." Id. col. 6, *ll*. 7-10. In the specific embodiment described by this sentence, there are two separate thermostatic valves enclosed in a single valve housing. The patent teaches that it is important "that the hot liquid chamber 45 and cold liquid chamber 46 [of the valve assembly] surround all of the thermostatic valves 50 disposed within corresponding valve bores, such as bores 42, 43, so that the hot and cold liquid, such as water, can be provided evenly and equally to all of the thermostatic valves." Id. col. 6, *ll*. 15-20. Thus, the cold fluid must make a connection with the valve bores so that the invention can provide tempered water at the outlets, or in the case of failure of the thermostat or the hot water source, provide cold water at the specified flow rate. Likewise, the specification states that an important safety feature of the invention "is embodied in the multiple thermostatic valves housed within a common valve body in mutual fluid communication with the hot and cold liquid inlets and the mixed liquid outlets." Id. col. 3, *ll*. 43-48. It is clear that fluid provides the connection between the thermostatic valves, the hot and cold inlets, and the mixed liquid outlets in the valve assembly and is the basis upon which the invention ensures continuous delivery of tempered water. *See* id. col. 3, *ll*. 48-50.

Based on this analysis, the Court finds that it must modify slightly its prior definition of in fluid communication. In the context of the '531 Patent, in fluid communication means that fluid makes the connection between the parts and areas specified, or that the parts so delineated are connected by fluid.

B. THE '960 PATENT

The '960 Patent describes a thermostatic mixing valve that provides quick responses to temperature changes over a wide range of flow rates, including low flow rates. '960 Patent, col. 1, *ll*. 46-60. The parties' dispute at both the preliminary injunction hearing and the *Markman* hearing centered around the language of claim 1. Claim 1 reads in full:

1. A thermostatic control valve assembly for mixing a hot fluid and a cold fluid for discharge at a controlled temperature, the valve assembly comprising:

a valve housing having a fluid outlet and separate hot and cold fluid inlets;

said valve housing including a mixing chamber in fluid communication with said outlet;

flow control valve means, fluidly coupled with said hot and cold fluid inlets and said mixing chamber, for controllably mixing hot and cold fluid received through said hot fluid inlet and said cold fluid inlet, respectively, and supplying the mixed fluid to said mixing chamber; and

a multiple response thermostat disposed within said mixing chamber between said outlet and said flow control valve means, said multiple response thermostat including a first thermostat portion having a first response rate and a second thermostat portion having a second faster response rate, said first thermostat portion being connected *in series* with *said second thermostat portion and said second thermostat portion being operably connected* to said flow control valve means.

Id. col. 9, *ll*. 22-44 (emphasis added). The Court addressed two of the disputed terms at the preliminary injunction phase of this suit, "a multiple response thermostat," and "in series." Prelim. Inj. Order at 31-37. Bradley did not offer additional evidence or argument about the interpretation of those phrases, relying upon

the record from the preliminary injunction proceedings. However, Bradley did raise new issues regarding other terms in claim 1 of the ' 960 Patent. Those terms include, "flow control valve means," "disposed within," and "operably connected ." The Court will address briefly the terms construed during the preliminary injunction phase of the suit, then address each newly disputed term in turn.

1. "*A Multiple Response Thermostat*" *and* "*In Series*"

During the preliminary injunction proceedings Bradley argued that a multiple response thermostat must have more than one segmented coil. Defs.' Prelim. Inj. Opp'n Br. at 31; Prelim. Inj. Hr'g Tr. at 32, Defs.' Opening Statement. Further, thermostat portions would be connected in series if they were connected with the end of one to the beginning of the other, regardless of their orientation relative to the length of the thermostat or the length of the mixing chamber. Prelim. Inj. Hr'g Tr. at 603-04, Ballanco-Cross. In contrast, Lawler argued that a multiple response thermostat is not limited to one with segmented coils; it must have a first portion and a second portion, having a first and second response rate respectively, such that the portions run the length of the thermostat. Pl.'s Prelim Inj. Br. at 47; Prelim. Inj. Tr. at 240, Oven Redirect; id. at 650-51, Pl.'s Closing Statement. Neither party offered evidence that the inventor limited the definition for the terms during prosecution of the patent, and the Court found none in its review of the prosecution history pursuant to the instant motion.

After reviewing the patent claims, the specification and the prosecution history, the Court finds no reason to deviate from the definitions for these terms that it determined at the preliminary injunction phase of these proceedings. First, the plain language of claim 1 does not specifically describe a thermostat that uses thermal coils. It merely describes two portions, with two response rates, arranged in series. '960 Patent, col. 9, *ll*. 37-42. The specification describes the multiple response thermostat as one that would have a tailored response rate. Id. col. 6, *ll*. 41-44. Moreover, the specification states that the pictured thermostat is a "variation of the thermal coil variety.... Also contemplated, however, are other segmented thermostats." Id. col. 6, *ll*. 56-63. The Court cannot find any reason in the purpose of the multiple response thermostat to limit the portions to thermostats of the thermal coil variety. As discussed in the specification, the thermostat described should be tailored to meet the desired operational characteristics of the thermostatic control valve. Therefore, it appears that the valve designer may choose any type of thermostats, arranged as described in claim 1, to create the result he or she desires.

Finally, pursuant to the doctrine of claim differentiation, dependant claim 2 seems to suggest that claim 1 does not require that the multiple response thermostat have thermal coils. Claim 2 states: "The thermostatic control valve assembly of claim 1, wherein said multiple response thermostat includes a thermal coil containing first and second volumes of temperature sensitive fluid corresponding to said first and second response rates, respectively." Id. col. 9, *ll*. 45-49. Under the doctrine of claim differentiation, different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope. *See* Comark Comm. Inc. v. Harris Corp., 156 F.3d 1182, 1187 (Fed.Cir.1998). Therefore, limitations in dependant claims generally are not read into the independent claims upon which they depend. *See* Karlin Tech. Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 971-72 (Fed.Cir.1999). In the '960 Patent, claim 2 clearly adds thermal coils to the thermostat of the invention described in claim 1. This finding, taken together with the plain meaning of the claim language itself and the context given by the specification, leads to a conclusion that a multiple response thermostat need not have thermal coils.

The Court finds that a multiple response thermostat as described in claim 1 must have two segments or portions, with different response rates. The two portions must be connected in series and the portion with the faster response rate must be operably connected to the flow control valve means. The thermostat portions need not have thermal coils.

Turning now to the meaning of the phrase "in series," the Court is convinced that the '960 Patent requires that the thermostat portions be oriented in a chain such that one portion comes in contact with the fluid in

the mixing chamber at a different time than the other. The plain meaning of "in series" is a chain of objects, one after the other. *Accord* AMERICAN HERITAGE DICTIONARY (3333333d Ed. SoftKey Int'l Inc.1994). Such a definition is consistent with the context of the '960 Patent. The '960 Patent invention is designed to provide quick temperature control over a wide range of flow rates. Id. col. 1, *ll*. 51-60; id. col 2, *ll*. 45-46. In large part, it is the thermostat design that allows the valve to achieve that objective. The specification reads:

Generally, thermostat 140 includes a first thermostat portion 142 connected in series with a second thermostat portion 143. Thermostat portion 143 has a faster response but smaller travel than portion 142 to provide immediate, accurate control nearest the discharge of flow control valve 114, where at low flows the hot and cold fluids may not be fully mixed. Conversely, thermostat portion 142 has a slower response but greater travel than portion 143 to provide subsequent control way [sic] from the discharge of flow control valve 114, where the hot and cold fluids are more fully mixed.

Id. col. 6, *ll*. 45-55. The design described here requires that the mixed fluid contact the different portions of the multiple response thermostat at different times to achieve the purpose of the invention. In addition, the specification provides that the thermostat depicted in the preferred embodiment "is designed to expand or contract along the axis defined by the push rod in response to a change in the temperature surrounding the thermostat." Id. col. 6, *ll*. 57-60. Again, this description highlights that the important orientation for the thermostat portions is along the axis defined by the push rod, or along the length of the thermostat itself.

The Court finds that the phrase "in series" requires that the thermostat portions be arranged in a chain or sequentially such that one portion comes in contact with fluid in the mixing chamber at a different time than the other.

2. "*Flow Control Valve Means*"

The parties agree that claim 1 uses means-plus-function language to describe the operation of the flow control valve means component of the '960 Patent invention. *See* Defs.' Opp'n to Claim Constr. at 5-6; Pl.'s Reply in Supp. of Mot. for Claim Constr. at 9 ("Pl.'s Reply on Claim Constr."). Likewise, the parties agree that the flow control valve means is the liner and piston of the thermostatic mixing valve. *See* Defs.' Opp'n to Claim Constr. at 7; Pl.'s Reply on Claim Constr. at 9. However, Bradley argues that the claim and the specification limit the invention to one that has non-linear response characteristics. Defs.' Opp'n to Claim Constr. at 8. In addition, Bradley argues that the '960 Patent specification requires that the flow control valve means control the flow of both the hot and the cold fluid. Id. at 7, 11. Bradley cites Wang Labs., Inc. v. America Online, Inc., 197 F.3d 1377 (Fed.Cir.1999) and 35 U.S.C. s. 112 para. 1 for the proposition that Lawler has limited itself to the structures disclosed in the patent specification. *Id*. at 10-11. Further, because the only structure disclosed in the specification for the flow control valve means calls for the liner and piston to control both the hot and cold water flow and to have orifices configured to provide non-linear flow, those are limitations that must be construed into the patent claims. *See id*. at 8, 10-11.

Conversely, Lawler argues that the specification describes the use of liner orifices whose geometry can provide either linear or non-linear flow. Pl.'s Reply on Claim Constr. at 10-14. Lawler asserts that at least one preferred embodiment disclosed in the '960 Patent describes a valve with linear flow characteristics. Id. at 10. Therefore, because claim interpretation only rarely can exclude a patentee's preferred embodiment, Bradley's argument must fail. Id. at 12 (citing *Gentry Gallery,* 134 F.3d at 1477). Lawler also distinguishes between claim 1 and claim 6 and its dependent claims. Claim 6 and its dependant claims were disallowed by the patent examiner until they were distinguished from claim 1 by adding language about non-linear flow characteristics. *Id*. at 13-14. Furthermore, Lawler asserts that the specification does not require that the liner and piston control the flow of both the hot and cold fluids. *Id*. at 9-10. Rather, claim 1 and the specification call for the flow control valve means, the liner and piston, to controllably mix the hot and cold fluid received through the hot and cold fluid inlets and to provide mixed fluid to the mixing chamber. *Id*. at 10.

The Court agrees with both parties that the language of claim 1 that describes the flow control valve means is in means-plus-function language. The corresponding function of the flow control valve means described by the patent is to "controllably mix hot and cold fluid received through said hot fluid inlet and said cold fluid inlet, respectively, and supply the mixed fluid to said mixing chamber." '960 Patent, col. 9, *ll*. 31-34. Therefore, pursuant to 35 U.S.C. s. 112, para. 6, the '960 Patent invention is limited to the structures for the flow control valve means that are delineated in the patent specification. Although the Court was led to believe by the parties' arguments that the two requirements of the liner and piston could be treated separately, upon close review of the '960 Patent, the Court is not convinced such treatment is possible. The structures for the liner and piston disclosed in the '960 Patent describe both the orientation of the orifices relative to the hot and cold fluid passageways and the shape of the orifices. Therefore, the Court will address each of the disclosed structures for the liner and piston in turn.

The first reference in the '960 Patent to the flow control valve means merely repeats the language of claim 1. '960 Patent, col. 2. *ll*. 1-4. The language reads:

Flow control valve means is fluidly coupled with the hot and cold fluid inlets and the mixing chamber for controllably mixing hot and cold fluid received through the hot fluid inlet and the cold fluid inlet, respectively, and supplying the mixed fluid to the mixing chamber.

Id. As a result, this language does not help define the structure of the liner and piston. Apparently, Lawler would have the Court rely upon this language as evidence that the liner and piston need not control both the hot and cold liquid flow. But, the issue is not what structure this language would support. The issue is what structure for the flow control valve means does the '960 Patent describe. For the answer to the later question, the Court must look to the remainder of the specification.

The next reference to the flow control valve means is found in column 2, lines 19-37. The patent reads:

In another embodiment of the present invention, ... [a] cylinder extends longitudinally through the valve housing and defines a cylindrical bore in fluid communication with the outlet. A piston is movably disposed in the cylindrical bore. First and second fluid passageways fluidly couple the hot and cold fluid inlets, respectively, to the cylindrical bore. A first fluid orifice is disposed in either the piston or the cylinder between the first fluid passageway and the cylindrical bore, and a second fluid orifice is disposed in either the piston or the cylinder between the second fluid passageway and the cylindrical bore.

Id. col. 2, *ll*. 15-29. In this disclosure it is possible to conceive of a structure for the liner and piston that would only control either the flow of hot or the flow of cold fluid through the respective passageway. The other passageway would remain open. For example, both of the orifices are disposed within the cylinder and the piston is configured such that its movement only varies the flow of hot liquid through one of the orifices. However, it is clear from the remainder of this passage that the embodiment described here is more descriptive of the invention in claim 6 than that in claim 1. *Compare* id. col. 2, *ll*. 29-37 *with* id. col. 10, *ll*. 8-32.

In claim 6, it is clear that the piston and/or liner orifices must be structured such that the flow through one orifice is non-linear with respect to the flow through the other. *See* id. col. 10, *ll*. 22-33. The '960 Patent teaches that the resulting flow rate of the mixed fluid would be non-linear. The patent reads:

One of the first or second fluid orifices has a shape such that the fluid flow rate through the one of the first or second fluid orifices varies non-linearly with respect to the fluid flow rate through the other of the first or second fluid orifices as the piston moves in the cylindrical bore, thereby causing a corresponding non-linear change in the mixed fluid temperature in the cylindrical bore.

Id. col. 2, *ll*. 29-37. In fact, as Lawler pointed out in its brief and during the *Markman* hearing, the language in claim 6 was changed to reflect this type of configuration of liner and piston to overcome a prior art reference. Pl.'s Reply on Claim Constr. At 13-14 (citing Pl.'s Mot. For Claim Constr. Exh. 5, Patent No. 5,323,960 Prosecution History, Paper 1, at 25-30 (" '960 Patent Prosecution History")). Therefore, it is unlikely that this description of the liner and piston was meant to limit the flow control valve means of claim 1. If it does so limit the liner and piston in claim 1, the liner and piston need not control the flow of both the hot and cold fluid, however, the orifices in the liner and/or piston must be such that the flow through one fluid orifice varies non-linearly with respect to the other.

The next passage that describes the liner and piston refers to the preferred embodiment depicted in Figure 1. The specification reads:

Referring now to FIG. 1, ... The inner wall of annular cavities 15 and 16 is defined by a cylindrically shaped liner 17. Liner 17 is open at both ends and includes a plurality of openings or slots 18 which are distributed around its circumference in communication with cavities 15 and 16.

Slideably mounted within liner 17 is a cylindrically shaped piston 19 which is open at its upper end. Piston 19 is preferably pressure balanced and includes a plurality of openings or slots 20 that are distributed around its circumference. Preferably, each opening 20 through piston 19 has a counterpart opening 18 in liner 17. Modulation of the piston 19 within liner 17 variably opens the cavities 15 and 16 to the interior of the piston 19, which communicates the combined hot and cold fluid to the outlet *14a* of the flow control valve.

Id. col. 3, *ll*. 48-68, col. 4, *ll*. 1-2; Fig. 1. This description of the liner and piston, and the corresponding figure, reveal that the inventor apparently intended that the liner and piston control the flow of both the hot and the cold fluids. The liner and piston have corresponding openings. Id. col. 3, *ll*. 65-66. In addition, the movement of the piston within the liner variably opens the cavity containing the hot fluid and the cavity containing the cold fluid to the interior of the piston. Id. col. 3, *ll*. 66-68, col. 4, *l*. 1. Thus, here the specification describes a liner and piston that together control the flow of both the hot and cold fluids. However, this structure does not require that the orifices be shaped to provide non-linear flow.

Bradley pointed to language elsewhere in the specification that it believed limits the geometry of the orifices in the liner and piston to shapes that provide non-linear flow characteristics. Bradley stated: "The '960 [P]atent specifically describes the plurality of orifices in the liner and provides that the orifices 128 and 130 are not rectangular slots, but are geometrically shaped to provide a valve having non-linear response characteristics." Defs.' Opp'n to Claim Constr. at 8 (citing '960 Patent, col. 6, *ll*. 21-26; Figs. 7 & 8). However, as Lawler pointed out in its brief and during the *Markman* hearing, Bradley omited a significant phrase from the description: "not necessarily." '960 Patent, col. 6, *l*. 22.

Describing Figure 6, the '960 Patent specification reads:

Similar to liner 17 of valve assembly 10, liner 126 is open at both ends and includes a plurality of orifices 128 and 130 which are distributed around its circumference in communication with annular cavities 120 and 122. However, unlike liner 17, orifices 128 and 130 are *not necessarily* rectangular or like other like slots but, instead, are of generally geometric shapes which provide a valve having non-linear response characteristics hereinafter described in conjunction with FIGS. 7-8.

Id. col. 6, *ll*. 17-26. As taught by Bradley in its brief and by Lawler's expert at the *Markman* hearing, rectangularly-shaped orifices provide linear flow characteristics; however, orifices of other geometric shapes such as circles provide non-linear flow characteristics. Therefore, the passage above clearly contemplates an orifice shape-rectangular-in the liner and piston that would achieve linear flow characteristics, and it specifically points to Figure 1, or "valve assembly 10," for such an embodiment. *Id*. col. 6, *ll*. 17-18. Correspondingly, the flow control valve means, or the liner and piston, depicted in Figure 1 is not limited to

structures with orifices that achieve non-linear flow characteristics.

Combining this information with the description of the liner and piston at column 3, lines 48-68 and column 4, lines 1-62, the Court finds that the liner and piston structure described in the two passages and depicted in Figure 1 has orifices in the piston and liner, where modulation of the piston within the liner variably controls the flow of both the hot and cold fluid, and the orifices are geometrically shaped to provide either linear or non-linear flow characteristics. The Court notes that the embodiment described here and pictured in Figure 1 does not have a multiple response thermostat as required by claim 1 of the '960 Patent. However, it does teach a limitation on the structure of the flow control valve means intended by the inventor.

The next description of the liner and piston, depicted in Figure 6, apparently contemplates the same type of control of hot and cold fluid flow as that described for Figure 1. *See* id. col. 6, *ll* . 1, 14-38; id. col. 7, *ll*. 59-68, col. 8, *ll*. 1-48, Figs. *7a-7c,* Figs. 8a-8c; id. col. 9, *ll*. 7-20, Fig. 6. In addition, the geometric shape of the orifices and the movement of the piston relative to the liner in Figure 6 apparently may result in either linear or non-linear flow. Specifically the '960 Patent reads:

Referring now to FIG. 6, ... [a] cylindrical bore 124 extends longitudinally through the mixing dome and control valve and is in fluid communication with the outlet 120.

Within the flow control valve 114, the inner wall of annular cavities 120 and 122 is a continuation of cylindrical bore 124 defined specifically by a cylindrically shaped liner 126. Similar to liner 17 of valve assembly 10, liner 126 is open at both ends and includes a plurality of orifices 128 and 130 which are distributed around its circumference in communication with annular cavities 120 and 122. However, unlike liner 17, orifices 128 and 130 are not necessarily rectangular or other like slots but, instead, are of generally geometric shapes which provide a valve having non-linear response characteristics hereinafter described in conjunction with FIGS. 7-8.

A cylindrically shaped piston 132 is disposed generally within cylindrical bore 124 and, in particular, is slideably mounted within liner 126. Modulation of the piston 132 within liner 126 results in the piston covering one of the fluid passageways 128 or 130 and uncovering the other respective fluid passageway, thereby variably combining hot and cold fluid for supply within the piston and cylindrical bore 124 and to the outlet 120 of the valve assembly. Preferably, piston 132 is pressure balanced and includes orifices 134 that are distributed around its circumference.

Id. col. 6, *ll*. 1, 10-38; Figs. 6, *7a-7c, 8a-8c*. Lawler argued at the *Markman* hearing that the phrase "not necessarily rectangular" in this passage allows for the possibility of rectangular orifice geometry in the structure of liner and piston for Figure 6, which would result in linear flow characteristics. The Court agrees that this is the case. But, the remainder of the passage teaches that the movement of the piston relative to the liner is such that both the hot and cold fluid passageways are covered or uncovered, or, in other words, both the hot and the cold fluid is controlled by the movement of the piston within the liner. The '960 Patent reads:

Modulation of the piston 132 within the liner 126 results in *the piston covering one of the fluid passageways 128 or 130 and uncovering the other respective fluid passageway,* thereby variably combining hot and cold fluid supply within the piston and cylindrical bore 124....

Id. col. 6, *ll*. 29-34. Figure 6 shows that fluid passageway 128 is open to the cold fluid reservoir, while fluid passageway 130 is open to the hot fluid reservoir. Further, the description provides that the piston covers one passageway and uncovers the other-thereby controlling both the hot and cold fluid flow. This disclosure is not surprising given that one of the stated objectives of the invention is to provide improved sensitivity to temperature changes. Id. col. 2, *ll*. 48-49. A structure that provides non-linear flow characteristics serves this purpose. Id. col. 9, *ll*. 14-20.

Finally, the '960 Patent teaches several other options for varying the fluid flow rate non-linearly in conjunction with the embodiment pictured in Figure 6. The patent reads:

[O]ther means for varying the fluid flow rate non-linearly between the hot and cold fluid passageways as the piston moves in the cylindrical bore are contemplated.... [M]eans for varying the fluid flow rate non-linearly is provided as long as a piston traverses within a cylinder to cause fluid orifices to be covered and uncovered such that the fluid flow rate through one of the orifices varies non-linearly with respect to piston movement, thereby yielding a more sensitive mixing valve.

Id. col. 9, *ll*. 7-20. As stated in this passage, apparently the element of non-linear flow characteristics was an important aspect of this invention because it achieved one of the stated objectives: enhanced sensitivity. Notwithstanding the apparent link between non-linearity and sensitivity, the ' 960 Patent does disclose a liner and piston structure that would yield linear flow characteristics. *See* id. col. 6, *ll*. 17-26.

After this careful review of the structures delineated in the '960 Patent for the liner and piston, or the flow control valve means, the Court concludes that contrary to Lawler's contention that the patent teaches a liner and piston that controls either the hot or the cold fluid, not both, *and* has orifices shaped to provide linear flow characteristics, the patent apparently teaches away from such structures. The '960 Patent teaches that the flow control valve means is structured in one of two ways:

OPTION ONE: a.) a liner and a piston that either

i.) control the flow of hot fluid, or

ii.) control the flow of cold fluid, or

iii.) control the flow of both the hot and the cold fluid; and

b.) the orifices in either the liner or the piston are shaped to provide non-linear flow characteristics

OPTION TWO: a.) a liner and a piston that control the flow of both the hot and the cold fluids; and

b.) the orifices in the liner and the piston are shaped to provide either

i.) linear flow characteristics, or

ii.) non-linear flow characteristics.

Lawler's interpretation of the structure for the flow control valve means is too broad.

3. "*Disposed Within*"

Bradley argues that when it distinguished the '960 Patent over the prior art U.S. Patent No. 2,282,152 (the "Babbin Patent"), the Court required the multiple response thermostat of the '960 Patent invention to be fully exposed in the mixing chamber. Defs.' Opp'n to Claim Constr. at 11-14. Therefore, disposed within means fully exposed in. Id. at 14. In contrast, Lawler argues that for a multiple response thermostat to be disposed within the mixing chamber, only the functional portions of the thermostat that contribute to the response rate must be exposed to the fluid in the mixing chamber. Pl.'s Reply to Claim Constr. at 15-17.

The Court primarily agrees with Lawler. Reading the claims in light of the specification, the Court finds that the phrase a multiple response thermostat disposed within the mixing chamber means that the temperature sensing portions of the thermostat are immersed in the fluid contained in the mixing chamber. Starting with

the plain language of claim 1, it appears that, at a minimum, the first and second thermostat portions of the multiple response thermostat must come in contact with the fluid in the mixing chamber between the valve assembly outlet and the flow control valve means. '960 Patent, col. 9, *ll*. 35-42. Those are the parts of the thermostat that are delineated by claim 1 as being part of the multiple response thermostat that is disposed within the mixing chamber. The purpose of the thermostat is to sense the temperature of the mixed fluid as it mixes in and is let out of the mixing chamber. Therefore, the temperature sensing thermostat portions must come in contact with the fluid mixture in the mixing chamber to perform as required.

The specification reveals that "[i]n order to reliably react to a change in the temperature of the fluid mixture, the thermostat must be immersed in the mixture." Id. col. 4, *ll*. 53-55. Similarly, another part of the specification teaches that the importance of immersing the thermostat in mixed fluid is "to assure that the thermostat receives a proper indication of the temperature of the exiting fluid." Id. col. 5, *ll*. 18-20. Clearly, the important part of the thermostat is the temperature sensing portions rather than either the rod that acts in response to changes in those temperature sensing portions, or any support structure.

The Court finds that the phrase disposed within means that the temperature sensing portions of the multiple response thermostat are immersed in the mixed fluid contained in the mixing chamber.

4. "*Operably Connected*"

Bradley also argues that the word operably in the phrase operably connected means directly because that is the only connection described in the specification. Defs.' Opp'n to Claim Constr. at 14-18. Bradley relies upon two cases for the proposition that operably in the '960 Patent can only mean directly, Toro Co. v. White Consolidated Indus., Inc., 199 F.3d 1295 (Fed.Cir.1999) and Gentry Gallery, Inc. v. Berkline Corp., 134 F.3d 1473 (Fed.Cir.1998). In those cases, the Federal Circuit found that the meaning of the disputed claim terms were limited by the disclosure in the patent specifications at issue. *See* Toro, 199 F.3d at 1301-02; Gentry Gallery, 134 F.3d at 1480. Bradley argues that the '960 Patent specification only discloses a multiple response thermostat that has a second, faster thermostat portion directly connected to the flow control valve means. Therefore, because no broader disclosure is made in the '960 Patent, operably must mean directly. Bradley specifically points to the following language in the '960 Patent:

1. "[A]n improved multiple response thermostat having a fast response rate adjacent to the entrance of the mixing dome for responding quickly to the temperature of fluid entering the mixing dome." '960 Patent, Abstract.

2. "Yet another object of the present invention is to provide a thermostatic control valve assembly which quickly responds to changes in fluid temperature at low flow conditions." Id. col. 2, *ll*. 43-46.

3. "Thermostat portion 143 has a faster response rate but smaller travel than portion 142 to provide immediate, accurate control nearest the discharge of flow control valve 114, where at low flows the hot and cold fluids may not be fully mixed. Conversely, thermostat portion 142 has a slower response but greater travel than portion 143 to provide subsequent control way [sic] from the discharge of flow control valve 114, where the hot and cold fluids are more fully mixed." Id. col. 6, *ll*. 48-55.

See Defs.' Opp'n to Claim Constr. at 15-16.

However, Lawler argues that there is no means-plus-function language in this part of the claim that would limit the invention described in claim 1 to one with the second thermostat portion directly connected to the flow control valve means. Pl.'s Reply to Claim Constr. at 5-7. Lawler argues that the plain meaning of operably is broader than directly. Id. at 6. Moreover, limiting the definition of operably to directly imports a limitation from the preferred embodiment into the claims, which is improper. *See* id. (citing Virginia Panel Corp. v. MAC Panel Corp., 133 F.3d 860, 866 (Fed.Cir.1997); Continental Paper Bag Co. v. Eastern Paper

Bag Co., 210 U.S. 405, 418 (1908)); *see also id*. at 6-7 (discussing Northern Telecom. Ltd. v. Samsung Elecs. Co., Ltd., 215 F.3d 1281, 1293 (Fed.Cir.2000)). Furthermore, the '960 Patent specification discloses a multiple response thermostat where the second portion with the faster response rate is connected to the flow control valve means through the first thermostat portion. Id. at 8 (citing ' 960 Patent, col. 7, *ll*. 14-29). Thus, Lawler argues that the plain meaning of operably is "either directly or indirectly."

The Court finds that in the context of the '960 Patent, operably connected to means capable of performing work on or capable of effecting the movement of. The '960 Patent describes an assembly that performs a function-quick regulation of the outlet temperature of water at low to high flow rates. ' 960 Patent, col. 1, *ll*. 46-60. The multiple response thermostat portion of the assembly is the key to performing the regulating function. Changes in the thermostat operate or work to move the parts that control the flow of hot and cold fluids through the valve assembly. *See* id. col. 2, *ll*. 5-14; id. Abstract (stating that the assembly has "an improved multiple response thermostat having a fast response rate adjacent to the entrance of the mixing dome for responding quickly to the temperature of fluid entering the mixing dome"). This is the basic principle upon which thermostatic mixing valves work and is well known to ones skilled in the art. *See* id. col. 1, *ll*. 13-23; id. col. 1, *ll*. 51-60; id. col.; id. Abstract. In the case of the ' 960 Patent invention, the specification provides that the thermostat works to move the push rod, which in turn works to make changes in the orientation of the liner and piston, or the flow control valve means, which in turn changes the amount of hot and cold fluid entering the valve assembly. Id. col. 4, *ll*. 3-24. Correspondingly, the change in the amount of hot and cold fluid flowing into the valve, changes the temperature of the mixed fluid at the outlet. *See* id. col. 2, *ll*. 1-5 ("Flow control valve means is fluidly coupled with the hot and cold inlets and the mixing chamber for controllably mixing hot and cold fluid received through the hot fluid inlet and the cold fluid inlet, respectively, and supplying the mixed fluid to the mixing chamber."); id. col. 4, *ll*. 11-24. According to the '960 Patent, this chain of events is triggered by the action of the thermostat upon the push rod. *See* id. col.4, *ll*. 11-24. Therefore, in the '960 Patent, the term operably in the phrase operably connected cannot be limited to directly because the thermostat is actually directly connected to the push rod, not to the flow control valve means, or the liner and piston. The '960 Patent contemplates that the action of the thermostat on the flow control valve means will be indirect. Specifically, the patent discloses that "[a]djustment screw 27 acts against spring 23 and thus allows the vertical position of the thermostat 26 *and ultimately of the piston* 19 to be adjusted, which in turn alters the relative proportions of hot and cold fluid passing through the openings 20." Id. col. 4, *ll*. 20-24 (emphasis added). Clearly, the word ultimately implies something other than directly.

The language that Bradley pointed out does not alter this analysis. First, the object of the invention "to provide a thermostatic control valve assembly which quickly responds to changes in fluid temperature at low flow conditions" provides no limitation on the means for accomplishing that task. Id. col. 2, *ll*. 43-46. As described in the discussion above, the multiple response thermostat as a whole is one of the features intended to fulfill that objective. *See* id. col. 1, *ll*. 51-60; id. col. 7, *ll*. 1-13.

Second, the '960 Patent Abstract states that the thermostatic mixing valve assembly of the invention "[a]lso include[s] ... an improved multiple response thermostat having a fast response rate adjacent to the entrance of the mixing dome for responding quickly to the temperature of fluid entering the mixing dome." Id. Abstract. Again, this language does not limit the invention to multiple response thermostats that have a second, faster portion directly connected to the flow control valve means. It does imply that the multiple response thermostat have a portion that has a fast response rate close to the entrance to the mixing dome. However, the remainder of the patent teaches that the entire thermostat assembly is attached to the piston by the push rod. In fact, as Lawler points out, the patent teaches that in an alternative embodiment

[c]oiled tubing 144 is filled with a temperature sensitive fluid and is sealed at one end 151 and is fluidly coupled at its other end 153 with an internal control piston ... contained within the hollow bore of cylindrical portion 145 of first thermostat portion 148. The temperature sensitive fluid expands with heat addition to advance the internal control piston which in turn acts on connecting rod 156 to advance piston

Id. at col. 7, *ll*. 21-29. Clearly, this embodiment teaches that the second thermostat portion need not be directly connected to the flow control valve means; but, indeed, it need only be able to effect the movement of the flow control valve means.

For the same reason, Bradley's third argument fails. Bradley argues that the only arrangement of thermostat portions disclosed by the patent is one where the portion with the faster response rate is closest to or adjacent to the discharge of the flow control valve, therefore, the second thermostat portion must be directly connected to the flow control valve means. FN2 As just discussed, the patent discloses an arrangement of thermostat portions where the second thermostat portion with the faster response rate is not directly connected to the flow control valve means, but must cause a change that effects the first thermostat portion that in turn effects the flow control valve means through movement of the push rod. Id. at col. 7, *ll*. 21-29.

FN2. At the *Markman* hearing Dr. Ovens testified that according to his experience and tests the arrangement of thermostat portions in the preferred embodiment pictured at figure 6 and described in the '960 Patent at column 6, lines 48-55 is backward. Thermostat response rate, as both experts testified at the preliminary injunction hearing, seems to be related to surface area exposed to the fluid. *See* Prelim. Inj. Hr'g Tr. at 164-65, 182, Ovens-Direct; id. at 219-20, Ovens-Cross; id. 547-48, 549-51, 553-54, Ballanco-Direct. The thermostat portions pictured in figure 6 indicate that the thermostat with the larger surface area is further away from the discharge of the flow control valve. *See* '960 Patent, Fig. 6; id. col. 6, *ll*. 48-55. Thus, Dr. Ovens testified that the faster thermostat portion is in fact further away from the discharge of the flow control valve. However, this revelation has no bearing on whether the second thermostat portion must be directly rather than operably connected to the flow control valve means. Claim 1, as interpreted by the Court in this order, supports either configuration.

In accordance with the analysis above, Lawler's proffered definition for the phrase operably connected, "directly or indirectly connected," does not adequately define the term either. The '960 Patent makes clear that the thermostat of the valve assembly described must act or work upon the flow control valve means for the assembly to perform as desired. Id. col. 2, *ll*. 1-14. This fact is not changed by the requirement in claim 1 that the second thermostat portion of the multiple response thermostat be operably connected to the flow control valve means. The second thermostat portion is part of the whole thermostat that acts to control the flow of hot and cold fluids through the assembly. So long as the second thermostat portion is connected such that it can effect the movement of the flow control valve means, this element of claim 1 is met.

Reading the plain meaning of claim 1 in light of the specification, the Court finds that operably connected to means capable of performing work on or capable of effecting the movement of.

CONCLUSION

After holding a hearing at which evidence and arguments were presented by both parties in this action for purposes of issuing a preliminary injunction and another hearing at which evidence and arguments were presented by both parties in this action for purposes of claim construction on the two patents at issue, the Court has defined the disputed terms as discussed in each section of this entry. The Court made every effort to focus on construction of the claims without reference to information regarding alleged infringement that was presented at the hearing on preliminary injunction. Additional matters pending before the Court will be addressed as appropriate.

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