United States District Court,
D. Delaware.

VERGASON TECHNOLOGY, INC., a New York Corporation,
Plaintiff.
v.
MASCO CORPORATION, a Delaware Corporation, Vapor Technologies, Inc., a Delaware Corporation, and Summa Holding Corp., a Delaware Corporation,
Defendants.

No. Civ.A. 95-286-JJF

May 17, 2001.

Owner of patent for electric arc vapor deposition device sued competitor for infringement. Construing claims, the District Court, Farnan, J., held that function of selective connection means was to join or fasten together alternate ends of cathode to power supply means, alternating between either end of cathode and with overlap period in between alternation in which both ends of cathode were connected to power supply, in order to cause arc to travel back and forth in sustained manner between two ends of cathode.

Claims construed.

5,037,522. Cited.

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OPINION

FARNAN**, District Judge.**

This action was brought by Plaintiff, Vergason Technology, Inc. ("Vergason") against Defendants Masco Corporation, Vapor Technologies, Inc., and Summa Holding Corp. (collectively "Masco") alleging infringement of United States Patent No. 5,037,522 (the " '522 Patent"). The parties briefed their respective positions on claim construction, and the Court conducted a *Markman* hearing on the disputed terms in the claim. This Memorandum Opinion presents the Court's construction of the disputed terms in the '522 Patent.

BACKGROUND

I. Introduction to the Technology Generally

The '522 Patent relates to an electric arc vapor deposition device which is used to deposit coatings on various types of articles. ('522 Patent, col. 1, l. 5-7). The articles coated by the device include such items as drill bits, cutting tools, plumbing fixtures, surgical tools like hip joints and automotive parts like headlights and taillights. (Tr. 33). The coatings used by the device for these articles include such substances as titanium nitride to prevent wear and corrosion, and nickel chrome for reflective applications. (Tr. 31).

Generally, electric arc vapor deposition is done inside a vacuum chamber using a high current electric arc generated from a power supply in the chamber. The power supply is akin to a large car battery that has a "plus" and "minus" output. The negative lead from the power supply is connected to a cathode and an arc is initiated on the cathode to create an arc discharge within the vacuum chamber. The high current electric arc then evaporates material off of a cathode forming a vapor. The vapor is then deposited on the articles to be coated. ('522 Patent, col. 1, l. 7-11; Tr. 32).

II. The '522 Patent

The '522 Patent discloses an electric arc vapor deposition device aimed at solving certain problems associated with its predecessor devices. In previous electric arc vapor devices, the arc would wander erratically across the face of the cathode causing the cathode material to be unevenly consumed. The uneven consumption of the cathode material would, in turn, reduce the life expectancy of the cathode material. Confinement devices were utilized in other devices to try to prevent the arc from wandering so that the cathode would be evenly eroded. However, the confinement devices frequently caused problems, because they would extinguish the arc if it wandered off the cathode. If the arc was extinguished, then the arc would need to be restruck to continue the evaporation of the cathode. Frequent restriking of the arc would cause large particle emissions, which would mix with the vaporized coating material and cause rough surfaces on the articles coated. ('522 Patent, col. 1, l. 30-35).

Attempting to address these problems, the '522 Patent discloses an electric arc device with five objectives. As described in the '522 Patent, the objectives of the invention are to provide an electric arc vapor device in which (1) the arc is maintained on the cathode without confinement devices which could extinguish the arc or cause the cathode to erode unevenly; (2) the arc travels rapidly along the length of a large cathode, so that larger articles and a larger number of articles can be evenly coated; (3) the device can be fitted inside hollow articles like pipes or tubes to evenly coat the inside surfaces of such articles; (4) a lower anode:cathode size relationship is used, so that a higher operating voltage but lower current can be used to improve coating uniformity and quality; and (5) the anode and cathode of the device are spaced further apart from one another so as to improve ionization rates, which in turn improves coating uniformity and quality. ('522 Patent, col. 1, l. 60-col. 2, l. 1-19).

According to the '522 Patent, the objects of the invention are achieved by utilizing a long, preferably cylindrical, cathode. ('522 Patent, col. 2, l. 20-22). Arc sensors are disposed proximate to a first and second end of the cathode which detect the presence of the electric arc on the cathode. The output of the sensors are then used to control a switching circuit which "selectively connects" the negative side of a power supply to either end of the cathode. ('522 Patent, col. 2, l. 23-30). The arc spot tends to travel toward the end of the cathode that is connected to the negative end of the power supply. Thus, if an arc is struck at the first end of the cathode, and the power supply is connected to the second end of the cathode, the arc spot will travel

toward the second end of the cathode. ('522 Patent, col. 2, l. 30-43). This characteristic of the arc enables the arc spot to travel back and forth between the two ends of the cathode through the use of the switching circuit which alternately connects the power supply to the ends of the cathode. As the arc spot travels toward the first end of the cathode, it is sensed by the first arc sensor and the power supply connection is switched to the second end of the cathode to cause the arc to reverse direction and travel back toward the second end. ('522 Patent, col. 2, l. 43-53). This arrangement is repeated to cause the arc to travel back and forth in a sustained manner, preventing the arc from being extinguished and causing a more even erosion of the cathode and a smoother coating of the articles. ('522 Patent, col. 2, l. 54-60).

Figure 1 of the '522 Patent depicts the electric arc vapor deposition device. The device includes a vacuum chamber containing two electrodes, an anode and a cylindrical-shaped cathode, which is formed from the coating metal selected like titanium, nickel or copper. The device also includes supports or "platforms" to hold the articles to be coated. Parallel to the cathode are two conductor rods. One rod is positioned to a "first end" of the cathode, and the other rod is positioned to a "second end" of the cathode. Sensor heads are attached to the rods to sense the presence of the arc spot on the cathode. The sensor heads detect the arc by sensing characteristics generated by the arc such as heat, light, an electric field or a magnetic field. The sensors can also be positioned in different places along the cathode to control the position of the arc on the cathode. ('522 Patent, col. 4, l. 19-34).

A high voltage power supply is also connected to the vacuum chamber. Specifically,the positive output of the power supply is connected to the vacuum chamber and the negative output is connected through a rotary contact brush to a rotatable shaft which is part of the article support platform. When metallic articles are coated, the power supply is used to apply a negative voltage bias to the fixture support, which in turn applies the negative voltage to the articles. The negative voltage bias of the articles is meant to improve the attraction of the coating materials of the articles. However, if non-metallic articles are coated, this power supply is not used. ('522 Patent, col. 4, l. 47-59).

A second power supply is also used in the device which is known as the arc power supply. The positive DC voltage output of the arc power supply is connected to a terminal on the anode and the negative DC voltage output of the power supply is connected to a switching circuit. The switching circuit, which is depicted in more detail in Figure 2, is used to "selectively connect" the negative side of the power supply either through a first connection line to a terminal on the first end of the cathode, or through a second connection line to a terminal on the second end of the cathode, depending on the position of the arc, which is determined by the sensors. ('522 Patent, col. 4, l. 60-65). The sensors send signals to the switching circuit to control this process, depending on where the sensors detect the arc.

As depicted in Figure 2, the switching circuit contains two comparators which compare the signals received from the sensors to an adjustable threshold voltage received from a potentiometer. The outputs from the comparators are then fed to a pair of corresponding pulse generator circuits. When a sensor detects the approach of the arc spot toward the first end of the cathode, the output of the comparator associated with that sensor increases and causes the pulse generator associated with that comparator to send a pulse to the SET input of a first D type flip-flop, through a first pair of buffers, to the RESET of a second D type flip-flop, and through a second pair of buffers to the RESET input of the first flip-flop. The Q outputs of the flip-flops are connected to the control inputs of a pair of power switches, which connect the negative side of the arc power supply to the cathode connection lines. ('522 Patent, col. 5, l. 17-31).

As described in the specification of the '522 Patent, when the first sensor detects the approach of the arc

spot, the first flip flop is set which causes the power switch to connect the negative side of the power supply to the second end of the cathode. A short period of time later, which is determined by the gate delay of the buffers, the second flip-flop is reset which causes the power switch to disconnect the negative side of the power supply from the first end of the cathode. A signal from the second sensor causes the power switch to connect the first end of the cathode to the power supply, and then causes the power switch to disconnect the second end of the cathode from the power supply. As described in the '522 Patent, it is during the overlap period caused by the gate delay buffers that the arc power supply is connected to both ends of the cathode to ensure that there is no interruption to the connection of the cathode which could cause the arc to be extinguished. ('522 Patent, col. 5, l. 32-50).

In sum, the device utilizes the arc's tendency to travel along the cathode toward the end of the cathode which is connected to the negative lead of the power supply. The sensors detect the presence of the arc and cause the switching circuit to connect and disconnect the negative lead from the ends of the cathode. This causes the arc to travel back and forth between the two sensors. In other words, if the negative lead of the arc power supply is connected to the first end of the cathode, the arc begins to travel toward that end. As the arc approaches the first end, the first proximity sensor detects its presence and causes the switching circuit to connect the negative lead of the power supply to the second end of cathode. Then the switching circuit disconnects the negative lead of the power supply from the first end, which causes the arc to travel in the opposite direction. As the arc approaches the second end, the second proximity sensor senses the change and causes the switching circuit to change the connections, thereby changing the arc's path so that it travels back and forth between the two sensors. This process, which permits the arc to travel back and forth, continues until the coating process is complete.

DISCUSSION

I. The Legal Principles of Claim Construction

[1] [2] [3] [4] Claim construction is a question of law. Markman v. Westview Instruments, Inc., 52 F.3d 967, 977-78 (Fed.Cir.1995), *aff'd,* 517 U.S. 370, 388-90, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). When construing the claims of a patent, a court considers the literal language of the claim, the patent specification and the prosecution history. Markman, 52 F.3d at 979. A court may consider extrinsic evidence, including expert and inventor testimony, dictionaries, and learned treatises, in order to assist it in construing the true meaning of the language used in the patent. Id. at 979-80 (citations omitted). A court should interpret the language in a claim by applying the ordinary and accustomed meaning of the words in the claim. Envirotech Corp. v. Al George, Inc., 730 F.2d 753, 759 (Fed.Cir.1984). However, if the patent inventor clearly supplies a different meaning, the claim should be interpreted accordingly. Markman, 52 F.3d at 980 (noting that patentee is free to be his own lexicographer, but emphasizing that any special definitions given to words must be clearly set forth in patent). If possible, claims should be construed to uphold validity. In re Yamamoto, 740 F.2d 1569, 1571 & n. * (Fed.Cir.1984) (citations omitted).

II. The Meaning Of The Disputed Terms of the '522 Patent

Vergason asserts Claim 1 and Claim 8 of the '522 patent. However, the parties acknowledge that Claim 1 and Claim 8 have nearly identical language, and that the disputed terms in Claim 1 and Claim 8 are the same and thus, should be interpreted by the Court in the same manner. (Tr. 6). Because the parties have focused their arguments on Claim 1, the Court will likewise focus its discussion on Claim 1, with the understanding that the Court's construction of the disputed terms in Claim 1 applies to the disputed terms in Claim 8.

In full, Claim 1 of the '522 Patent provides:

An electric arc vapor deposition device comprising:

a) a chamber for received articles to be coated;

b) a first electrode disposed in said chamber;

c) a second electrode disposed in said chamber and spaced from said first electrode; said second electrode having a first end and a second end;

d) power supply means for generating and sustaining an electric arc between said first and second electrodes which causes surface material on the second electrode to vaporize and be deposited on said articles;

e) means to sense when an electric arc between said first and second electrodes approaches said first or second end of said second electrode;

f) means to connect a first side of said power supply means to said first electrode; and,

g) means to connect selectively a second-side of said power supply means to either said first end or said second end of said second electrode, said means to connect selectively being responsive to said means to sense so that when an arc approaches said first end of said second electrode, said means to connect selectively connects the second side of said power supply means to said second end of said second electrode, and when an arc approaches said second end of said second electrode, said means to connect selectively connects the second side of said power supply means to said first end of said second electrode,

whereby, an electric arc formed between said first and second electrodes is caused to travel back and forth between said first and second ends of said electrode.

The parties have raised paragraphs (c), (d) and (g) in their claim construction arguments. Accordingly, the Court will turn to the construction of the disputed terms at issue.

A. ***Paragraph (c) of Claim 1 of*** the '522 Patent

In its Post-Markman Hearing Proposed Conclusions Of Law And Argument, Vergason raises the scope of limitation (c) of Claim 1 of the '522 Patent. Specifically, Vergason contends that the phrase "a second electrode disposed in said chamber" includes an anode located separate from the walls of the chamber or using the wall of the vacuum chamber as the anode. (D.I. 65 at 1-2). Vergason contends that "[i]n view of [its] presentation and Masco's non-contesting thereof with any rebuttal evidence or argument, it appears that there is no controversy between the parties" as to the scope of this element. (D.I. 65 at 1).

In response to Vergason's position, Masco contends that Vergason's "allegation regarding alternatives for the anode structure is more properly directed to the range of structural equivalents for paragraph (c), rather than its literal scope, in view of the 'disposed in said chamber' limitation, which is clear on its face." (D.I. 68 at 4). Because Masco contends that the range of structural equivalents for this limitation is a factual inquiry and not a claim construction inquiry, Masco "defers any argument regarding such alleged structural

equivalents until the infringement stage of this litigation." (D.I. 68 at 4). In support of its position Masco relies on the decision in Motorola, Inc. v. Interdigital Tech. Corp., 930 F.Supp. 952-62 (D.Del.1996) (Longobardi, J.).

The Court disagrees with Masco's position regarding paragraph (c), and reads Vergason's argument to be a request for construction of the phrase "in said chamber." Because the meaning of the language "in said chamber" is appropriately resolved by the Court as part of its claim construction, the Court disagrees with Masco's position that this issue should be deferred. However, because Masco offers no alternative interpretation of the claim language, it is unclear to the Court whether Masco agrees with Vergason's interpretation of the phrase "in said chamber." Accordingly, at this juncture, the Court will not construe the phrase "in said chamber." *See* Bell Communications Research, Inc. v. Fore Systems, Inc., 113 F.Supp.2d 635, 640 (D.Del.2000) (declining to construe claims which are either not responded to by opposing party or are rebutted by opposing party without sufficient explanation and/or without advancing counter-proposal for construction). However, if after consultation among the parties, a party still seeks construction of this phrase, the Court will require that party to submit a letter memorandum, no more than three pages in length (with customary margins and font size), stating the proposed construction of the phrase and the reasons for the construction. The opposing party is then required to submit a letter in response, no more than three pages in length (with customary margins and font size) indicating its position, i.e., whether it concedes to the definition proposed, and if not, offering an alternative proposed construction and the reasons for the proposed construction.

B. ***Paragraph (d) of Claim 1 of*** the '522 Patent

In its Post-Hearing Brief On Claim Construction, Masco raises paragraph (d) of Claim 1 of the '522 Patent, which provides: "power supply means for generating and sustaining an electric arc between said first and second electrodes which causes surface material on the second electrode to vaporize and be deposited on said articles." Masco contends that paragraph (d) of Claim 1 should be construed "to specify the function of providing *sufficient amps DC* to strike the arc (i.e., generate the arc), and *sufficient amps DC* to sustain the arc." (D.I. 64 at 14) (emphasis in original). Masco further contends that the arc power supply is the corresponding structure described in the specification for performing the specified function of paragraph (d), and thus, the Court should construe the structure for the "power supply means" to be "an ordinary off-the-shelf arc power supply." (D.I. 64 at 15). However, Masco indicates that "it is believed that the construction of this limitation is not in dispute," however, Masco raises the issue "to dispute[ ] any contention that the structure [or function] of the "power supply means" is intermixed in some way with the selectively connect function, as apparently contended by Vergason." (D.I. 64 at 14-15).

In response to Masco's argument concerning paragraph (d) of the '522 Patent, Vergason contends that "Masco is correct, there is no controversy over the scope of limitation (d), including its range of equivalents." (D.I. 67 at 14). To this effect Vergason contends that it does not argue that its "power supply means for generating and sustaining" the arc in limitation (d) is the same as the "means to connect selectively" in limitation (g). Vergason characterizes the parties' disagreement as "irrelevant semantics" as to whether the power supply means includes only the power source as Masco contends or the wiring leading therefrom as Vergason contends. However, Vergason contends that this disagreement is of no import to the case. (D.I. 67 at 14).

Although Masco does not couch its argument in the same terms as Vergason, the parties apparently agree that this paragraph is not in need of construction and that "the power supply means for generating and

sustaining the arc" in paragraph (d) is not the same "means to connect selectively" in paragraph (g). Accordingly, the Court will offer no construction for this paragraph.

C. *Paragraph (g) of Claim 1 of* the '522 Patent

The heart of the parties' dispute in this case is the construction of paragraph (g) of Claim 1 of the '522 Patent. Specifically, the parties dispute the meaning of the phrase "means to connect selectively" which is repeated throughout paragraph (g). Although the parties' dispute the meaning of this phrase, the parties agree that paragraph (g) is a "means-plus-function" limitation, the interpretation of which is governed by 35 U.S.C. s. 112, para. 6.

[5] In pertinent part, Section 112, para. 6 provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claims shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereto.

Although use of means-plus-function language in a claim is permissible, a means clause does not encompass every means for performing the specified function. *The* Laitram Corporation v. Rexnord, 939 F.2d 1533, 1535 (Fed.Cir.1991). Rather, the limitation must be construed "to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." Odetics, Inc. v. Storage Technology Corp., 185 F.3d 1259, 1266 (Fed.Cir. July 6, 1999). Accordingly, to construe this paragraph the Court is required to identify the structure in the Vergason '522 Patent which corresponds to the "means to connect selectively" and determine the specific function of the "means to connect selectively." Lockheed Martin Corp. v. Space Systems/Loral, Inc., 249 F.3d 1314, 2001 WL 436028 (Fed.Cir. Apr.30, 2001).

1. Structure Corresponding to the "Means To Connect Selectively"

With regard to the structure corresponding to the "means to connect selectively," Vergason contends that the structure is the circuitry illustrated in Figure 2 of the '522 Patent and described in col. 5, lines 10-50 of the specification. (D.I. 65 at 6, para. 14). Masco apparently agrees with Vergason that the "switching circuit" designated as structure 60 in Figure 1 and depicted in more detail in Figure 2 is the structure that corresponds to the "means to connect selectively." (D.I. 64 at 10; D.I. 68 at 9). However, Masco contends that the "issue regarding structure centers on the fact that the accused device ... as described by Dr. Richard Welty [Masco's expert witness] with reference to his patent and to working drawings of the device, does not include a switching circuit, power switch, or any other structure as described in the Vergason Patent, interposed between the negative terminals of the two power supplies used [by the accused device] ... and the two ends of the cathode." (D.I. 64 at 11).

Masco's argument with regard to structure is essentially an argument relating to infringement, because it compares the accused device with the claims of the patent. Because the Court's analysis in a *Markman* hearing is limited to the interpretation of the disputed language of the claims, the Court will not address Masco's argument. Accordingly, based on the agreement among the parties' respective positions, the Court concludes that the structure corresponding to the "means to connect selectively," is the circuitry identified as structure 60 in Figure 1, depicted in more detail in Figure 2 of the '522 Patent and described in detail in the specification of the '522 Patent at column 4, lines 62-68 and column 5, lines 10-50.

To the extent that the parties request the Court to rule on the range of equivalents for the structure described in paragraph (g), the Court declines to do so as part of its claim construction. The determination of structural equivalents under Section 112 would require the Court to assess the differences between the disclosed structures and the accused structures. Motorola, Inc., 930 F.Supp. at 961-62. Because claim construction does not contemplate a comparison between the disclosed device and the accused device, the Court will not address the range of structural equivalents in its claim construction analysis. FN1

FN1. In its Post Hearing Brief On Claim Construction, Masco urges the Court to exclude from the range of equivalents certain devices disclosed by prior art known as the Kirichenko patent. However, in the Court's view, Vergason's response to Plaintiff's brief did not provide the Court with sufficient guidance as to Vergason's position on Masco's argument. Accordingly, the Court declines, at this stage in the litigation, to address Masco's argument.

2. Function of the "Means To Connect Selectively"

Vergason contends that the function of the "means" described in paragraph (g) of Claim 1 of the '522 Patent is "to 'connect selectively' alternate ends of the cathode to the power supply means recited in limitation (d)." (D.I. 65 at 6). In further defining this function, Vergason contends that the term "connect" means to flow or send electrical energy to a designated end of the cathode. Vergason also contends that the term "selectively" refers to the switching circuit used "for alternating a dominant flow of current to one end of the cathode or the other to attract the arc to that end (i.e. the dominant negative end). Vergason further contends that within the term "selectively" is the "overlap period caused by the gate delay of the buffers 84 and 88, during which both ends of the cathode 16 are connected to the arc power supply 58[to] insure[ ] that there will be no interruption of the connection to the cathode 16 which could cause extinguishment of the arc." ('522 Patent, col. 5, lines 45-50). Combining these definitions, Vergason contends that the term "to connect selectively" means:

When the end of the cathode opposite that at which the arc is sensed is selected to become the dominant negative end (to attract the arc back to it), electrical energy is provided to both ends of the cathode simultaneously by appropriately connecting both of them to the power supply thereby to sustain the arc and prevent it from extinguishing during turning.

(D.I. 65 at 7-8; Tr. 52-53, 56-58). In support of its position, Vergason relies on the '522 Patent's specification, the prosecution history and the testimony of its expert witness, the inventor named in the '522 Patent, Gary E. Vergason.

In response to Vergason's position, Masco contends that the term "connect" means "joining two otherwise disconnected electrical leads together." (D.I. 68 at 6). In other words, Masco contends that the term connect "implies a pre-existing disconnected state between the power supply and one of the ends of 'said second electrode.' " (D.I. 64 at 6). With regard to the term "selectively" Masco contends that "selectively" specifies "an important alternating between either end of the cathode." (D.I. 68 at 6).

Masco also takes issue with Vergason's argument that the "overlap period" is incorporated into the "selectively connect" function. Although Masco agrees with Vergason that the "connect selectively" function is instrumental in producing the result of causing the arc to travel 'back and forth,' as recited in the whereby clause, Masco contends that the "back and forth travel of the arc is never associated in the Vergason Patent

with the unclaimed overlap period (which prevents the arc from extinguishing)." (D.I. 68 at 13). Thus, according to Masco the phrase " 'connect selectively' is a single term, which properly expresses an alternate connecting and disconnecting of each end of the cathode from the negative end of the power supply." In addition, Masco disputes Vergason's interpretation of the specification and prosecution history of the '522 Patent and relies upon the testimony of its expert witness, Dr. Richard Welty, Ph.D.

[6] [7] In construing the disputed language of a claim, the Court must begin its analysis with the language of the claim itself. The claim is then analyzed in the context of the specification of the patent, which is "highly relevant, and usually dispositive, in a claim construction analysis of the disputed term." Sunrise Medical HHG, Inc. v. AirSep Corp., 95 F.Supp.2d 348, 437 (W.D.Pa.2000). In addition to the specification, the Court may also rely on the prosecution history of the patent, including any express representations made by the applicant regarding the scope of the claims. In this regard, the prosecution history "is often of critical significance in determining the meaning of th[ose] claims." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Extrinsic evidence like expert testimony, prior art documents, inventor's testimony, dictionaries, technical treatises and articles may only be used "to assist the court in understanding the claims and may not be used to vary or contradict the claim language." Sunrise Medical, 95 F.Supp.2d at 438 (citing Vitronics, 90 F.3d at 1584). When extrinsic evidence is used in claim interpretation, sources available prior to the litigation are preferred over testimony or evidence created with the specter of looming litigation. *Id*. With regard to expert testimony, specifically, the Federal Circuit has held that expert testimony as to the proper construction of a disputed claim term, "may only be relied upon if the patent documents, taken as a whole, are insufficient to enable the court to construe disputed claim terms." Vitronics, 90 F.3d at 1585.

[8] After reviewing the language of the claim, in light of the specification of the '522 Patent, the Court concludes that the function of paragraph (g) of Claim 1 of the '522 Patent is to "connect selectively" alternate ends of the cathode to the power supply means recited in limitation (d) of Claim 1 in order to cause the arc to travel back and forth in a sustained manner between the two ends of the cathode. In reaching this conclusion, as to the function of paragraph (g), the Court must further construe the term "connect selectively."

The phrase "connect selectively" and the terms "connect" and "selectively" are not explicitly defined in the patent or the specification. However, in the Court's view, the specification defines the phrase and terms by implication. Specifically, the Court concludes that the term "connect" is used in the specification in a manner consistent with the word's ordinary and customary meaning of "joining or fastening together." As the specification of the '522 Patent explains:

In the present invention, as the arc approaches the first end, the first proximity sensor will sense ... the arc and cause the switching circuit to *connect* the negative *lead* of the power supply to the second end of the cathode, and then *disconnect* the negative lead from the first end.

('522 Patent col. 6, l. 3-16) (emphasis added). That the term "connect" means "joining or fastening together" is further explained in that portion of the specification describing the manner in which the switching circuit 60 operates:

Thus, for example, when the first sensor 28 senses the approach of the arc spot, the first flip flop 80 will be set and cause the power switch 90 to *connect the negative side of the power supply* 58 to the second end of the cathode 16, while a short time period later as determined by the gate delay of the buffers 84, the second

flip-flop 86 will be reset and cause the power switch 92 to *disconnect the negative side of the power supply* 58 from the first end 26 of the cathode.

('522 Patent, col. 5, l. 32-40) (emphasis added). Given the use of the word "connect" in the specification, the Court finds no support in the claim language or the specification for Vergason's specialized definition of "connect" as "flowing or sending electrical energy."

With regard to the word "selectively," the Court concludes that the appropriate definition of the term "selectively," as it is used in the specification, includes a combination of the definitions advanced by the parties. In the Court's view, Masco is correct that the term "selectively" is used in the specification to denote an alternating between either end of the cathode; however, Vergason is also correct that the term "selectively" incorporates the "overlap period" explained in the specification. FN2 Accordingly, the Court concludes that the term selectively means "an alternating between either end of the cathode with an overlap period in between the alternation in which both ends of the cathode are connected to the power supply."

FN2. If possible, the Court is required to construe a claim so as to uphold its validity. *See* In re Yamamoto, 740 F.2d at 1571 & n. *. In the Court's view, Masco's definition alone as "alternating between either end of the cathode" is too broad and fails to take into account the actual working of the invention as it is described in the specification. Likewise, in the Court's view, Vergason's definition is a bit "too contrived" in light of the infringement and validity issues raised by the parties' litigation.

This definition is supported by the passages of the specification quoted by the Court in the context of the word "connect," as both these passages discuss alternating the connection between the ends of the cathode. In addition, the Court's definition is supported by the specification which explains that there is an overlap period in which both ends of the cathode are "connected" or "joined" to the power supply:

[W]hen the first sensor 28 senses the approach of the arc spot, the first flip flop will be set and cause the power switch 90 to connect the negative side of the power supply 58 to the second end 27 of the cathode 16, *while a short time period later* as determined by the gate delay of the buffers 84, the second flip flop 86 will be reset and cause the power switch 92 to disconnect the negative side of the power supply 58 from the first end of the cathode 16....

The *overlap period* caused by the gate delay of the buffer 84 and 88, during which *both ends of the cathode 16 are connected to the arc power supply* 58, insures that there will be *no interruption of the connection to the cathode* 16 which could cause extinguishment of the arc.

('522 Patent, col. 5, l. 32-40, 45-50) (emphasis added).

Masco contends that the overlap period described in the specification is not part of paragraph (g), because it is an unclaimed tangential function. Masco cites to column 5 lines 32-40 of the specification as the "corresponding functional language" to the "means to connect selectively" described in paragraph (g), but Masco contends that it is appropriate to omit the overlap period from this portion of the specification. (D.I. 64 at 8). The Court disagrees with Masco. Part of the function of paragraph (g) is to work with the power supply means described in paragraph (d) to cause the arc to travel back and forth in a sustained manner between the two ends of the cathode as described in the '522 Patent and explained in detail in the specification. As described in the specification, the overlap period is an essential part of the circuitry which

performs the "connect selectively" function, and therefore, the Court disagrees with Masco's argument that overlap period should be read out of the language in the specification describing the structure and function of paragraph (g)'s "means to connect selectively."

Although the Court does not think it is necessary to consult extrinsic evidence given the language of the claim and the specification, the Court observes that its claim construction is consistent with the technology of the Patent, as explained by the inventor, Gary Vergason, whose testimony the Court found to be more credible than the expert testimony offered by Masco's Dr. Richard Welty. As Mr. Vergason explained, if the overlap period was not part of the means to connect selectively described in limitation (g), and the means to connect selectively just involved an alternate connecting and disconnecting to the power supply as Masco contends, the arc would extinguish, rather than travel back and forth in a sustained manner as explained in the specification of the Patent and the claim language as a whole. (Tr. 52-53, '522 Patent, col. 5, l. 45-50). Thus, in the Court's view, an interpretation of the term "connect selectively" which does not include the "overlap period" and which only includes an "alternating between the ends of the cathode" is inconsistent with the very spirit and functioning of the device as explained in the claim language and the specification. FN3

FN3. There also appears to be some dispute among the parties as to the meaning of the term "back and forth" as that term is used in the "whereby" clause of the '522 Patent. Vergason contends that the term "back and forth" includes the "turning of the arc by prevention of its extinguishment (i.e. sustainability)." (D.I. 65 at 13). Masco disputes Vergason's interpretation of the phrase, but it is unclear to the Court what definition Masco proposes for the phrase "back and forth." Absent an alternative definition offered by Masco, the Court is reluctant to interpret the term. Accordingly, if after consultation among the parties, the meaning of this term remains in dispute, the parties shall submit letter memoranda consistent with the procedure outlined in Part II. A. of this Opinion, so that the Court can render an informed claim construction ruling that takes into account the parties' respective positions on the disputed term.

To the extent that the parties request the Court to analyze the way and result of limitation (g), the Court declines to do so in its claim construction analysis. The function/way/result test is a tool used for infringement analysis under the doctrine of equivalents, and therefore, the Court will not blend its claim construction analysis with an infringement analysis.

CONCLUSION

For the reasons discussed, the Court has construed the disputed terms of the '522 Patent as provided herein. An Order consistent with this Opinion will be entered setting forth the meaning of the disputed terms in the '522 Patent.

D.Del.,2001.
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