IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

ILLINOIS TOOL WORKS, INC. by and through its SIMCO Division	:	
Plaintiff,	:	CIVIL ACTION
v.	:	NO. 02-CV-175
ION SYSTEMS, INC.,	:	
Defendant.	:	

MEMORANDUM AND ORDER

Anita B. Brody, J. **March , 2003**

INTRODUCTION

On January 14, 2002, plaintiff Illinois Tool Works, Inc. ("ITW"), by and through its SIMCO Division, filed a complaint for patent infringement against defendant Ion Systems, Inc. ("Ion"). In its complaint, ITW alleged that Ion manufactured a device that infringes an existing ITW patent, U.S. Patent No. 6,252,756 B1 (the "`756 Patent"). On June 6, 2002, Ion filed counterclaims for patent infringement against ITW, alleging that ITW had infringed three Ion patents: U.S. Patent No. 4,809,127 (the "`127 patent"), U.S. Patent No. 5,930,105 (the "`105 patent"), and U.S. Patent No. 6,259,591 B1 (the "`591 patent").

All the patents-in-suit involve technology for controlling electrostatic discharges. In particular, the claims concern ionization systems that control the amount of static electricity in a room. These ionizers produce positive and negative ions that are dispersed near devices and work areas that are sensitive to electrostatic discharges. The ionizers prevent the buildup of

unwanted static charges by supplying ions of the opposite polarity that combine with and thereby neutralize errant charges. To maintain this neutral balance, the ionizers must continually produce ions and respond to shifting levels of electrostatic discharge. The difficulty of keeping a room or workspace static-free is compounded by the gradual degradation of the emitter modules that produce the neutralizing ions. These variables have posed a series of problems for those industries in need of "clean," or static-free, rooms. They have also spawned the series of patents at issue in this case.

On June 3, 2002, I informed the parties of the need, pursuant to Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384 (1996), for a hearing on the issue of claim construction. Shortly thereafter, on June 10, they presented the court with a joint tutorial on the physics of room ionization systems. In preparation for the Markman hearing, Ion and ITW submitted numerous documents that presented arguments on how the court should construe the disputed claims. These submissions included copies of the patents-in-issue, declarations by defendant's expert Dr. Mark Horenstein, the prosecution history for the various patents, proposed claim construction orders, and discussions of the relevant law. After the hearing, I requested additional briefing on the nature and scope of the court's authority to define the disputed terms.[1] I have considered all of the submissions, including those documents and graphics that the parties presented both at the hearing and thereafter. Given the voluminous nature of the materials before me, however, I will not necessarily refer to each and

[1]In response to my request for additional briefing, both ITW and Ion presented synopses of the law regarding claim construction. Ion also submitted a proposed form of order, to which ITW objected. ITW then made a supplemental submission of evidence relating to the issue of claim construction, which Ion argued was untimely. Despite the parties' respective objections, I have considered the contested submissions.

every document.

Unsurprisingly, the parties presented conflicting interpretations of the disputed claim terms. This decision represents an effort to resolve their dispute. It begins by presenting the legal principles that govern how to construe a claim. It then identifies the disputed terms, the parties competing claim constructions, and the judicial construction of the terms' proper scope and meaning.

PRINCIPLES OF CLAIM CONSTRUCTION

There are two stages in the litigation of patent infringement cases. First, the court must determine the scope and meaning of those patent claims disputed by the parties. Then, a judge or jury compares the judicially-defined claims with the device that allegedly infringes upon them. Cybor Corp. v. FAS Technologies, Inc., 138 F.3d 1448, 1554 (Fed. Cir. 1998) (en banc); Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). The first step, often referred to as "claim construction," typically occurs after a court conducts a "Markman hearing," wherein the parties present arguments for why the court should construe a claim a certain way. The second step occurs at trial, after the court has issued its decision on how the claims should be construed.

The language of a patent generally resolves how a court should define a patent's disputed terms. Interactive Gift Express, Inc. v. Compuserve Inc., 256 F.3d 1323, 1331 (Fed. Cir. 2001); Phonometrics, Inc. v. Northern Telecom Inc., 133 F.3d 1459 (Fed. Cir. 1998). A court begins its claim construction analysis by examining the "intrinsic evidence," which consists of the patent's

claims, specification,[2] and, if in evidence, the prosecution history.[3] Vitrionics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996). Intrinsic evidence is preferred over extrinsic evidence.[4] Id. at 1583; Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys., 132 F.3d 701, 706 (Fed. Cir. 1997). Where possible, the intrinsic evidence alone should determine the meaning of a claim term. Optical Disc Corp. v. Del Mar Avionics, 208 F.3d 1324, 1334 (Fed. Cir. 2000); Bell & Howell Document Mgmt., 132 F.3d at 705.

Among the three different types of intrinsic evidence, the court "look[s] first to the claim language itself to define the scope of the patented invention." Bell Atlantic Network Servs., Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1267 (Fed. Cir. 2001). After looking at the claim language, the court can consider the remaining intrinsic evidence, Interactive Gift, 256 F.3d at 1331, however, the court "does not accord the specification, prosecution history, and other relevant evidence the same weight as the claims themselves." Eastman Kodak Co. v. Goodyear Tire & Rubber Co., 114 F.3d 1547, 1552 (Fed. Cir. 1997) *overruled on other grounds by* Cyber Corp. v. FAS Technologies, Inc., 138 F.3d 1448, 1452-1455 (Fed. Cir. 1998) (en banc).

This hierarchy among the sources of intrinsic evidence translates into a "proscription of

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[2]The specification of a patent should describe the invention in clear terms so that a person skilled in the relevant art may make and use the invention. 35 U.S.C. § 112. It usually includes the background of the invention, a summary of the invention, drawings, and a detailed description of the invention's preferred embodiment.

[3]The prosecution history is the public record of a patentee's submissions to the Patent and Trademark Office regarding a particular patent. See Katz v. AT&T Corp., 63 F.Supp.2d 583, 589 (E.D. Pa. 1999); Tulip Computers, Internationali B.V. v. Dell Computer Corp., 235 F.Supp.2d 264, 373 (D. Del. 2002).

[4]"Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." Markman, 52 F.3d at 980.

not reading limitations" from the specification and prosecution history into the claim language. Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1204 (Fed. Cir. 2002) (holding that limitations from the specification should not be read into the claims); see also Middleton, Inc. v. Minn. Mining and Mfg. Co., 311 F.3d 1384, 1388 (Fed. Cir. 2002) (stating that claims should usually not be narrowed by statements in the prosecution history). With respect to the patent specification, this proscription is borne out by two general guidelines: "(a) one may not read a limitation into a claim from the written description," or limit a claim to a preferred embodiment described in the specification, "but (b) one may look to the written description to define a term already in a claim limitation, for a claim must be read in view of the specification of which it is a part." Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1248 (Fed. Cir. 1998).

When the language of the claim is clear on its face, the court begins by giving the disputed term its "ordinary and accustomed" meaning as understood by one of ordinary skill in the art at the time of invention. Tate Access Floors, Inc. v. Maxcess Technologies, Inc., 222 F.3d 958, 965 (Fed. Cir. 2000) (quoting Renishaw 158 F.3d at 1248, n.2). In such circumstances, the court's consideration of the specification and prosecution history is restricted to determining whether either of the two conflicts with the claim language's ordinary and accustomed meaning. Interactive Gift, 256 F.3d at 1331. If a term has more than one plausible ordinary meaning, the court must consult the intrinsic record to identify which of the possible meanings is "most consistent with the use of the words by the inventor." Texas Digital, 308 F.3d at 1203. Although there are limitations on the degree to which a court can rely on the specification and prosecution history in construing a claim term, "the intrinsic record must...be examined in every case to determine whether the presumption of ordinary and customary meaning is rebutted." Id. at 1204.

There are a limited number of circumstances in which a court will reject the ordinary and accustomed meaning of a claim term. The Federal Circuit Court of Appeals has recognized at least four occasions when a court must deviate from a term's ordinary meaning. See CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366-1367 (Fed. Cir. 2002). First, the claim term will not receive its ordinary meaning if a patentee acted as her own lexicographer and set forth her own definition of the disputed claim term in either the specification or the prosecution history. Id. at 1366. Second, the ordinary meaning will not suffice if the intrinsic evidence shows that the patentee distinguished the term from prior art. Id. at 1367. Third, the term will require further definition if the ordinary meaning would render the claim unclear or meaningless. Id. Finally, terms phrased in step-plus or means-plus function format cover only the corresponding structure or step disclosed. Id. These exceptions notwithstanding, "unless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art." Texas Digital, 308 F.3d at 1202 (citing Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed. Cir. 2001).

The court can consult extrinsic evidence for limited help in determining a disputed term's ordinary and accustomed meaning. Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002). However, a court should only refer to such evidence if the meaning of the term cannot be discerned from the intrinsic evidence. Vitrionics, 90 F.3d at 1584. Reference to extrinsic evidence is permitted because, although extrinsic evidence "may not be used to vary or contradict the claim language," id., extrinsic materials "may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history." Markman, 52 F.3d at 980.

A series of recent Federal Circuit decisions have noted the useful nature of extrinsic evidence like dictionaries, encyclopedias, and treatises in aiding judicial determinations of ordinary and customary meaning. See, e.g., Texas Digital, 308 F.3d at 1202 ("dictionaries, encyclopedias and treatises are particularly useful resources to assist the court in determining" term meaning); Teleflex, 299 F.3d at 1325 ("[dictionaries, encyclopedias and treatises] may be the most meaningful sources of information to aid judges in better understanding both the technology and the terminology used by those skilled in the art to describe the technology"); CCS Fitness, 288 F.3d at 1366 ("Sensibly enough, ... dictionary definitions may establish a claim term's ordinary meaning"); see also Vitrionics, 90 F.3d at 1584 n.6 ("Although technical treatises and dictionaries fall within the category of extrinsic evidence. . .they are worthy of special note.").

The Federal Circuit's enthusiasm for dictionary definitions as a means of determining the proper scope and meaning of a claim illustrates the conundrum that claim construction can pose for the courts. The blackletter law of patent analysis presents a clear hierarchy of authority: the court should consider first the claim language, then the remaining intrinsic evidence, and, thereafter, in limited circumstances, extrinsic evidence. See, e.g., Interactive Gift, 231 F.3d at 866. Yet cases like Texas Digital suggest that the court should begin its claim construction by looking to a dictionary. This apparent paradox recalls the oft-cited decision of Autogiro Company of America v. United States, 384 F.2d 391, 397 181 Ct.Cl. 55, 155 U.S.P.Q. 697 (1967), wherein the predecessor to the Federal Circuit, the U.S. Court of Claims, noted with exasperation that "[p]atent law is replete with major canons of construction of minor value," and concluded that, despite previous judicial decisions to the contrary, claims "cannot be clear and

unambiguous on their face. A comparison must exist." Similarly, while the doctrine of claim construction urges courts to limit their analysis to the claim language itself, the practice of claim construction requires the courts to refer to intrinsic and extrinsic evidence to determine the proper meaning of a term. This reality raises confusion as to how and when a court should consult evidence other than the claim language.

A recent Delaware district court decision neatly engages the post-Texas Digital question of how to resolve the apparent conflict between doctrine and practice. For this reason, the decision is worth quoting at length:

> The *Texas Digital* court suggests that when construing the words of a claim, the court should first determine the ordinary and accustomed meanings of disputed claim words through an examination of relevant dictionaries, encyclopedias, or treatises. This determination will reveal the broadest definition of those terms as understood by one of skill in the art. Having made that determination, the court must next examine the written description and prosecution history to determine whether the full scope of the definition of a disputed term is covered by the invention or whether that scope has necessarily been limited as a result of the patentee clearly setting forth an inconsistent definition of the disputed term or otherwise disavowing or disclaiming the full scope of the term's meaning. Following this procedure, the court construing claims may avoid improperly importing claim limitations to a single embodiment described in the specification as might occur if the court begins its analysis with an examination of the written description and prosecution history.

Tulip Computers, Internationali B.V. v. Dell Computer Corp., 235 F.Supp.2d 264, 373 (D. Del. 2002).

This approach is sensible and I shall employ it when construing the claims disputed by the parties.

CONSTRUCTION OF THE DISPUTED TERMS

There are four patents-in-issue: the '756 patent, the '127 patent, the '105 patent, and the `591 patent. At oral argument, ITW notified Ion and the court that it would not contest Ion's proposed claim construction for the `105 patent. The parties have not presented any disagreement on the construction of those claims found in the `591 patent. As there are no disputed terms in either the `105 or `591 patents, I will not discuss them.[5] I will only address the `756 and `127 patents, in that order.

I. ITW's `756 Patent: "Low Voltage Modular Room Ionization System"

This decision discusses eight disputed claims in the '756 patent. As the parties often

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[5]Nowhere in this patent will I discuss undisputed patent terms. My decision to discuss only those patents in dispute is based on two issues. First, this order is a "free-standing" Markman order. By "free-standing," I mean that this order construes those claims disputed by the parties without also resolving a related motion, i.e. a motion to dismiss, a motion for summary judgment, or a motion for a preliminary injunction. A number of district courts have professed unease as to whether a free-standing order "run[s] afoul of the 'case and controversy' limitation on judicial power expressed in the Constitution." MediaCom Corp. v. Rates Technology, Inc., 4 F.Supp.2d 17, 22 (D. Mass. 1998) (citing U.S. Const. art. III, § 2); see also Thomson Consumer Elecs. v. Innovatron, S.A., 43 F.Supp.2d 26, 29 (D. D.C. 1999). Sensitive to this concern, I believe that any construction of an undisputed claim would risk running afoul of the Constitution and its justiciability requirements. Second, although they did not specify why, recent free-standing Markman opinions from this court and its neighbors have construed only disputed claims. See e.g. Tulip Computers, 235 F.Supp.2d 264; Aztrazeneca AB v. Mutual Pharm. Co., Inc., 221 F.Supp.2d 535 (E.D. Pa. 2002); Katz v. AT & T Corp., 63 F.Supp.2d 583 (E.D. Pa. 1999). To date, the Federal Circuit has not advised the district courts to depart from this practice and to begin construing undisputed claims. Accordingly, in light of the constitutional considerations of art. III, § 2 and the uncontroversial decisions of other judges, I will limit my analysis to the parties' disputed claims.

cannot agree on either the meaning of the terms or on which words they are disputing, those terms selected by ITW are demarcated by bold type and Ion's selected terms are highlighted with an underline. Those terms selected by both are in bold and underlined. These are the terms that will be construed.

Discussion of the disputed terms will begin with a recitation of both parties' proposed construction. The subsequent analysis of the terms' proper constructions will start, where applicable, with a dictionary definition of the disputed language. This definition will be compared to the language of the claim itself. I will then consider whether the specification requires any further limitation of the claim's apparent "ordinary and accustomed" meaning. Some disputed terms occur throughout the patent. They are defined only once. The initial construction is presumed to apply to the patent as a whole, unless otherwise indicated.

B. Claim 17

17. A method of controlling positive and negative ion output current in an electrical ionizer having (i) **positive** and **negative ion emitters**, (ii) **positive** and **negative high voltage power supplies** associated with the respective positive and negative ion emitters, and (ii) **current metering circuitry** for monitoring the positive and negative ionizer ion output current, the method comprising:

(a) storing an **ion output current reference value** in a **software-adjustable memory** in the electrical ionizer;

(b) during operation of the electrical ionizer, **comparing** the **ion output current reference value** to an **actual ion output current value** taken by the current metering circuitry; and

(c) **automatically adjusting** at least one of the positive and negative high voltage power supplies if the actual ion output current value is not equal to the ion output current reference value **the adjustment being performed in a manner which**

causes the actual ion output current value to become equal to the ion output current reference value.

1. "**Current metering circuitry** [for monitoring the positive and negative ion output current]"

ITW proposes that the court define this element of the claim as: "circuitry used to measure a value corresponding to the amount of current." Pl.'s Revised Proposed Order Regarding Claim Construction at 3. Ion argues that it means: "circuitry used to produce a binary number corresponding to the amount of current." Def.'s Proposed Order re Claim Construction for the `756 patent at 2.

The parties' chief disagreement is over whether the circuitry "measures" or "produces" the value that corresponds to the amount of current.[6] Neither side discusses why one word is superior to the other, nor why either of these words should replace the language of the claim itself: *monitoring*. The word "monitor" is consistent with the specification. See `756 patent, col. 7:42-42. The word "measure" is not. The specification says that the current metering circuitry can "amplify" the voltage that draws a current through a resistor and "pass" this signal to the A/D converter. `756 patent, col. 8:5-8. The words "amplify" and "pass" could resemble the verb "to produce." On the other hand, "to measure" implies a degree of computation or calculation.[7]

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[6]Ion, foreshadowing the parties' debate over how to construe "ion output current reference value," asserts that the word "value" should be defined as a "binary number." Because the word "value" is not part of the term "current metering circuitry," it would be premature to construe it now. I will discuss the proper construction of the word "value" in § 2 directly below.

[7]Dictionary definitions for the verb "to measure" include: "to ascertain the dimensions, quantity, or capacity of" and "to estimate by evaluation or comparison." American Heritage Dictionary of the English Language (4th 2000). Acts of ascertaining or estimating require analysis, whereas "passing" and "amplifying" do not.

There is no intrinsic evidence that supports the inference of measurement or calculation. The word that appears consistently throughout the patent's language is "monitor" and, therefore, "monitor" will be used in the construction. Insofar as there is evidence for Ion's preferred verb as well, I will also include "produce" in the claim construction.

The term "current metering circuitry," for purposes of the `756 patent shall mean: "circuitry used to monitor or produce a value corresponding to the amount of current." The meaning of the word "value" in this construction shall be consistent with the definition given to the word in § 2 directly below.

2. "**Ion output current reference value**"

ITW defines this term as "a value corresponding to a desired ion current output by at least one electrode, the value is used as a reference value." Pl. Revised Proposed Order Regarding Claim Construction at 2. Ion contends it is "a binary number corresponding to an ion current output by at least one electrode; the value is used as a reference value." Def.'s Proposed Order re Claim Construction for the `756 patent at 3.

The only word is really in dispute is "value." The construction for "value" shall ultimately reflect limitations required by language from the specification. Before incorporating these limitations, however, I will begin by discussing the dictionary definition and the claim language. This process will ensure that the construction does not improperly import limitations from the specification. See Tulip Computers, 236 F.Supp.2d at 373.

The primary definition for "value" in the New IEEE Standard Dictionary of Electrical and

Electronics Terms is "[t]he quantitative measure of a signal or variable." New IEEE Standard Dictionary of Electrical and Electronics Terms (5th ed. 1993). This definition from a technical dictionary resembles the mathematical entry for the word in an ordinary dictionary: "[a]n assigned or calculated numerical quantity." American Heritage Dictionary of the English Language (4th 2000). In light of Texas Digital, these definitions can be construed to suggest the ordinary meaning of the word "value" as understood by one of ordinary skill in the art.

Neither of these two dictionary definitions restricts the numerical representation in question to a binary format. Under existing case law, the claim construction analysis should therefore begin with the presumption that "value" could be binary, but need not be. The practical consequence of such a presumption is that "value" could be binary, meaning digital or software-based, analog, meaning hardware-based, or both binary and analog. It remains only to be determined whether such a definition conflicts with either the claim language or the specification. See Interactive Gift, 256 F.3d at 1331.

Ion makes two sets of arguments for why the `756 patent's intrinsic evidence conflicts in such a way as to require that "value" always be digital. The first set involves the claim language and the second set concerns the specification.

Ion argues that the claim language requires a narrower construction of the word "value." It points to the word "storing" in the language of claim 17 as evidence that the value must be digitally preserved. The claim language clearly states that the ion output current reference value is stored in "a software-adjustable memory." ITW agrees that the "reference value" is digitally stored. See Markman Hr'g Tr. at 15. Nonetheless, it does not concede that "value," for purposes of the `756 patent, is necessarily digital. Pl.'s Reply Claim Construction Br. at 10. Rather, ITW

argues that the fact that a value is stored digitally does not mean the value itself must originally be digital. Id. at 8-10. ITW argues that nothing in the claim language supports Ion's universal construction of "value" as a digital numerical representation, for no mention is ever made of either a specifically binary or digital value and the fact that a value is stored digitally does not require that the value be digital at the outset. Ion has failed to rebut this argument.

Ion makes two arguments for limitations based on language found within the specification. First, Ion points to language from the specification that both introduces the patent and comments on its preferred embodiment. Ion argues that this language necessarily narrows the dictionary definition of "value" because the specification disavows certain forms that a value can take. If language within the specification disclaims a usage or distinguishes its patent application from prior art on the basis of a different type of use, the claim construction should reflect these self-imposed limitations. See CCS Fitness, 288 F.3d at 1367; SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1340-1341 (Fed. Cir. 2001) (holding that, when the specification clearly disavows a feature, that feature is outside the reach of the claim language even if the language might otherwise be broad enough to encompass the feature in question). It must therefore be determined whether ITW has in fact disclaimed a form or type of value that would otherwise be consistent with the word's ordinary and accustomed meaning.

There are two passages within the `756 patent that potentially conflict with a definition of value that encompasses both digital and analog numerical representations. The first passage states "[i[nstead of using analog-type trim potentiometers, the emitter module uses a digital or electronic potentiometer or a D/A converter. The balance and ion current values are stored in a memory location in the emitter module and are adjusted via software control." `756 patent, col.

6:17-22. This language comes shortly after an introduction of the `756 system's "improved capabilities over conventional systems" and is listed as part of the first example of "[s]ome of the improved capabilities." `756 patent, col. 6:10-12. These improved capabilities are informed by an earlier section of the patent specification, wherein the drafters distinguished their product from prior art:

> Most feedback systems are entirely or primarily hardware-based. Many of these feedback systems cannot provide very fine balance control, since feedback control signals are fixed based upon hardware component values. Furthermore, the overall range of balance control of such hardware-based feedback systems may be limited based upon the hardware component values.

`756 patent, col. 1:54-60. In light of both the prior art and the "improvements" made by the `756 patent, plaintiff cannot now claim that "value" should encompass hardware component values or any value connected to use of an analog-type trim potentiometer. Such a reading would conflict with the plaintiff's own patent specification.

Second, Ion notes that, in the patent's preferred embodiment, the ion output current values are stored digitally.[8] The structures and methods recited in a preferred embodiment, however, do not restrict the range of physical entities covered by a patent to those described in the embodiment. Renishaw, 158 F.3d at 1248. The fact that the preferred embodiment discloses a digital value therefore cannot, by itself, limit a claim's construction.

For these reasons, "value" shall be defined as "any numerical quantity or measure that is

[8]"The 'preferred embodiment' is a practical, workable example of the invention described by the claims of the patent." Slater Elec., Inc. v. Thyssen-Bornemisza Inc., 650 F.Supp. 444, 450 (S.D. N.Y. 1986). The preferred embodiment is contained within the specification.

not generated by an analog-type trim potentiometer or described as 'hardware component.'"[9] The word "value", for purposes of construing this claim, is to be modified by the ordinary meanings of the words "ion," "output." "current," and "reference." Because "the same term or phrase should be interpreted consistently where it appears in claims of common ancestry," Epcon Gas Sys., Inc v. Bauer Compressors, Inc., 279 F.3d 1022, 1030 (Fed. Cir. 2002) (citing Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 980 (Fed. Cir. 1999), I will not repeatedly redefine the word "value." See also CAE Screenplates v. Heinrich Fiedler GmbH, 224 F.3d 1308, 1317 (Fed. Cir. 2000) (noting that, ordinarily, the same word in a patent has the same meaning); Georgia Pacific Corp. v. United States Gypsum Co., 195 F.3d 1322, 1331 (Fed. Cir. 2000) (same). Rather, the word "value," for purposes of the `756 patent, retains the same definition throughout.

3. "**Comparing** [the] **ion output current reference value** [to an] **actual ion output current value**"

ITW defines this method claim as: "using either a software routine or a circuit element that accepts as one input the ion output current reference value and as another input a representation of the actual ion output current value and varies its output based upon whether the values are equal." Pl.'s Revised Proposed Order Regarding Claim Construction at 2. Ion argues that it is "using a software routine that accepts as one input the ion output current reference value and as another input a binary number that corresponds to the actual ion output current value and

[9]It may in fact be that any value that is consistent with these limitations is digital. The parties' presentations to the court suggest that a value is either digital or analog. Rather than making an unjustified conclusion on the basis of those introductory materials submitted to the court, I have restricted the claim construction to only those meanings that the specification clearly supports.

outputs a result based upon whether the numbers are equal." Def.'s Proposed Order re Claim Construction for the `756 patent at 3.[10]

Like the construction of "value," the construction for "comparing" shall reflect limitations required by language from the specification. Nonetheless, for the reasons stated earlier, analysis of the disputed term should begin with the dictionary definition and the claim language.

The key word to be defined is "compare."[11] The common dictionary definition for the word "compare" is "[t]o examine in order to note the similarities or differences of." American Heritage Dictionary of the English Language (4th 2000). Both Ion and ITW adopt the ordinary meaning of the word "compare:" each party's construction assumes that "comparing" is noting the similarities or differences between the actual ion output current value and the ion output current reference value. Nonetheless, both parties' definitions attempt to narrow this dictionary definition. One attempt involves a dispute over the plain meaning of the claim language. The other proposes to limit the ordinary meaning based on evidence contained in the specification.

The first set of disputes over how to construe "comparing" can be resolved through

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[10]ITW agrees with Ion that the ion output current reference value is digitally stored. It also agrees that, to compare two values, those values must be in the same format, i.e. digital or analog. ITW argues, however, that the comparison of the reference and actual ion output current values at issue in this claim could be performed using either digital or analog representations of the respective values. Plaintiff also claims that nothing in the specification requires that the comparison occur when the values are in digital form. For these reason, ITW asserts, the court cannot conclude that the values are necessarily digital. Pl.'s Reply Claim Construction Br. at 3-7.

[11]The only other word the parties appear to dispute is "value", insofar as Ion seeks to limit this word to a digital representation of a numerical quantity. This dispute is moot in light of my discussion in § I.A.2 above. As stated above, the word "value" is to have one construction for the entire `756 patent.

reference to the claim language. ITW argues that the comparing step "varies its output based upon whether the values are equal." This interpretation is not supported by the plain language of the claim. The comparing step now at issue occurs in step (b). Step (c) of claim 17 openly discusses whether and when a variation of an output current occurs. There is no reason to read this later step, namely the system's response to the comparison, into the language now in question. Such a definition would unnecessarily conflate two steps and therefore breed confusion. Ion's position that the comparison "outputs a result based upon whether the numbers are equal," however, is a logical application of the dictionary definition to this particular claim: Ion's proposed "output" is the notation of the values' similarities or differences alluded to in the dictionary definition. It is therefore consistent with the dictionary definition and the claim language.

The second disagreement requires reference to the specification. The parties' remaining dispute is over whether or not the "comparison" is performed using software or hardware. The patent's specification only describes a digital comparison performed by a microcontroller. See `756 patent, col. 7:53, col 8:12. As discussed above, limitations from the specification should be read into the claim language only when the ordinary usage conflicts with the specification. See CCS Fitness, 288 F.3d at 1367; SciMed Life, 242 F.3d at 1340-1341. Ion presents compelling evidence for why the dictionary definition of "compare" conflicts with the intrinsic evidence. Within the specification, plaintiff repeatedly emphasizes the improvements of the `756 system over prior systems that relied on hardware component values and hardware-based balancing

systems.[12] '756 patent, col. 1:54-63, col. 11:17-34. Based on this intrinsic evidence, any "comparison" step in the `756 patent should be free from the earlier imperfections. The claim language, like the patent itself, thus can only use a non-hardware-based system for comparing (or balancing) values. Consequently, the terms "comparing the ion output current reference value to an actual ion output current value" mean: "using a non-hardware-based system to a) examine the actual ion current value and the ion output current reference value and b) note any similarity or difference between the two values."

4. "**Automatically adjusting**"

The two parties' definitions for this term are similar. ITW offers the following construction: "varying or changing in a predetermined manner." Pl.'s Revised Proposed Order

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[12]The applicable specification language reads as follows:

As discussed above, conventional automatic balancing systems have *hardware-based feedback systems*, and *suffer from at least the following problems*:

> (1) Such systems cannot provide very fine balance control, since feedback signals are fixed based upon hardware component values;
>
> (2) The overall range of balance control is limited based upon the hardware component values.
>
> (3) Quick and inexpensive modifications are difficult to make, since the individual components are dependent upon one another for proper operation. Conventional ion current control circuitry suffers from the same problems. *In contrast* to conventional systems, the software-based balance and ion current control circuitry of the present invention do not suffer from any of these deficiencies.

'756 patent, col. 11:17-34 (emphasis added).

Regarding Claim Construction at 2. Ion suggests the words should mean: "increasing or decreasing by a predetermined amount as a direct consequence of the result of the comparison." Def.'s Proposed Order re Claim Construction for the `756 patent at 4. Each party proposes that the term means changing something based on a "predetermined" instruction; the "something" to be changed is "at least one of the positive or negative high voltage power supplies." No adjustment occurs if the two values compared in step (b) are the same.

The dictionary defines "automatic" as "acting or operating in a manner essentially independent of external influence or control." American Heritage Dictionary of the English Language (4th 2000). Ion contends that "automatically adjusting" should be limited to a change that is "a direct consequence of the result of the comparison." This proposed limitation is unnecessary. Properly read in the context of the sentence of which it is a part, this consequence is self-evident. Because neither the claim language nor the specification contradicts the dictionary definition of automatic, I will incorporate it into the claim construction. The term "automatically adjusting" shall mean: "changing at least one of the high voltage power supplies in a manner independent of external influence or control."

5. "**The adjustment being performed in a manner which causes the actual ion output current value to become equal to the ion output current reference value**"

The dispositive word in this element of the claim is "manner." ITW wants it to mean "varying or changing the actual ion output current so that the measure of the ion output current continuously moves toward the value of the current reference value." Pl.'s Revised Proposed Order Regarding Claim Construction at 3. Ion proposes that "manner" means "the increase or

decrease by the predetermined amount being such that an increase is used if by increasing by the predetermined amount the actual ion output current becomes closer to the ion output current reference value" and the opposite for purposes of decreasing the actual ion output current. Def.'s Proposed Order re Claim Construction for the `756 patent at 4.

The dictionary definition for "manner" is: "a way of doing something or the way in which a thing is done or happens." American Heritage Dictionary of the English Language (4th 2000). ITW offers no explanation for why the word "continuously" should limit this claim term, other than that it is mentioned within the specification. Nothing in the claim language suggests why the "way" of bringing the actual ion output current value to equal the ion output current reference value should be limited to a specific method like "continuously." Nor does a broad definition like the dictionary's conflict with the specification. Accordingly, there is no need to incorporate such a limitation.

Ion's proposed construction clarifies the "manner" in which the two values are brought equal, so long as it does not restrict the "manner" to either a continual or periodic change in value. Ion's use of the word "predetermined" to limit the word's ordinary meaning threatens to import such a limitation. A construction containing the word "predetermined" would therefore be confusing and unsupported by either the claim language or the specification.

For the reasons stated above, the proper construction for the "manner" in which the disputed adjustment is performed shall be: "the actual ion output current value is either increased or decreased until it equals the ion output current reference value."

B. Claim 26

26. An electrical ionizer having positive and negative ion emitters and positive and negative high voltage power supplies associated with the respective positive and negative ion emitters, the electrical ionizer comprising:

(a) a **software-adjustable memory for storing an ion output current reference value**;

(b) a **comparator** for comparing the ion output current reference value to an actual ion output current value taken by current metering circuitry which monitors the positive and negative ionizer ion output current; and

(c) an **automatic ion output current adjustment circuit** for adjusting at least one of the positive and negative high voltage power supplies if the actual ion output current value is not equal to the ion output current reference value, the adjustment being performed in a manner which causes the actual ion output current value to become equal to the ion output current reference value.

1. "**Software-adjustable memory for storing an ion output current reference value**"

ITW offers the following construction: "a digital data storage element that holds a value which can be changed (i.e. adjusted) to a new value. The value is changed via software, as opposed to hardware or circuitry." Pl.'s Revised Proposed Order Regarding Claim Construction at 2. Ion proposes: "a semiconductor memory device that preserves a binary number used as a reference value that corresponds to an ion current output in a storage device." Def.'s Proposed Order re Claim Construction for the `756 patent at 5.

I have already defined the words "reference" and "value" for purposes of understanding the phrase "ion output current reference value." See supra. These definitions should be used consistently throughout the patent. See Epcon Gas, 279 F.3d at 1030-31. I will therefore ignore

Ion's repeated effort to insist that "value" must be a digital number. Those words that remain to be defined are therefore "software-adjustable memory" and "storing."

The dictionary definition for "to store" is: "to reserve or put away for future use." American Heritage Dictionary of the English Language (4th 2000). This definition is similar to the parties' own proposals, "hold" and "preserve". The computer science definition for "memory" is: "a unit of a computer that preserves data for retrieval." Id. The parties have offered no intrinsic evidence for why these dictionary definitions, insofar as they represent the words' ordinary and accustomed meaning, should be altered. For this reason, I will define the term "software-adjustable memory for storing an ion output current reference value" as follows: "a unit of a computer that holds a value that can be changed to a different value via software."

2. "**Comparator**"

ITW describes this word as: "software code or an electronic circuit that compares two values." Pl.'s Revised Proposed Order Regarding Claim Construction at 5. Ion argues that it means "a digital circuit running a software routine that accepts two binary input values and outputs a result to indicate whether or not the two input values are equal." Def.'s Proposed Order re Claim Construction for the `756 patent at 6.

Any claim construction of "comparator" must be consistent with the "comparing" step defined in claim 17. See Epcon Gas, 279 F.3d at 1030. The dictionary defines "comparator" as "any of various instruments for comparing a measured property of an object, such as its shape, color, or brightness, with a standard." American Heritage Dictionary of the English Language

(4th 2000). This construction is overbroad for purposes of the '756 patent. To be consistent with claim 17, supra § I.A.3, and the intrinsic evidence, a "comparator" can only use a non-hardware-based system for comparing values. The proper construction is therefore "any non-hardware-based instrument that compares two values."[13]

3. "**Automatic ion output current adjustment circuit**"

ITW's claim construction is: "a circuit used to increase or decrease the ion output current of the positive and/or negative high voltage power supplies based on the result of the comparison performed by the comparator." Pl.'s Revised Proposed Order Regarding Claim Construction at 5. Ion's proposed construction is: "a circuit under the control of a software routine used to increase or decrease the ion output current by a predetermined amount." Def.'s Proposed Order re Claim Construction for the `756 patent at 6.

The parties agree that the change in the ion output current is based on the result from either the comparison step or the performance of the comparator. Def.'s Opp'n Br. re Claim Construction of the `756 patent at 22. They disagree on the meaning of "circuit." Ion contends that this circuit must be under the control of a software routine. ITW argues that such a construction impermissibly limits the claim language. The dictionary definition of "circuit," in the context of electronics, is: "a closed path followed or capable of being followed by an electric current." American Heritage Dictionary of the English Language (4th 2000). Nothing in the

[13]To avoid unnecessary repetition or inadvertent confusion, I will incorporate the constructions for "value" and "compare" previously described in § I.A.2-3.

claim language or specification requires that circuit be limited in the manner proposed by Ion.

ITW and Ion also disagree over whether the ion output current must be changed by a "predetermined amount." ITW argues that Ion's proposed limitation would unreasonably preclude ITW's product from employing an electronic circuit to compare two values. I have already defined the comparator and the comparing step for purposes of the `756 patent. Therein, I found that the `756 patent disavowed any balancing or comparing step that was "hardware-based." See supra §§ I.A.3, I.B.2. These decisions do not, however, preclude the patent from employing hardware like an electronic circuit. So long as mere use of the circuit is insufficient to render the "comparison" "hardware-based," i.e. the hardware circuit is not a signature feature of the step in question, it can be properly included within the construction for this claim.

The proper construction, consistent with my discussion of claim 17, is: "a circuit used to increase or decrease the ion output current of the positive and/or negative high voltage power supplies based on the result of the comparison performed by the comparator."

C. Claim 30

30. An electrical ionizer according to claim 26 further comprising:

(d) **means for adjusting the ion output current reference value** being adjusted if an indicator of the actual ion output current value measured in the work space near the electrical ionizer is not near a desired value, the adjustment being performed to cause the indicator of the actual ion output current value to become near the desired value.

1. "**Means for adjusting the ion output current reference value**"

Only Ion offers a proposed construction for this element of the claim: "an IR transmitter and IR receive circuit, including IR receiver, IR decoder and two rotary encoder switches, and microcontroller; or a central controller circuitry, including pushbutton switches, microcontroller, memory, RS-485 communications communicating with miswire protection circuitry, RS-485 decoder/encoder, and a microcontroller and equivalents thereof." Def.'s Proposed Order re Claim Construction for the `756 patent at 7. Although it does not offer a competing construction, ITW does dispute Ion's proposed definition. ITW complains that Ion's construction is factually and legally incorrect. Pl.'s Reply Claim Construction Br. at 25.

This disputed element of claim 30 is in mean-plus-function form. In certain circumstances, a claim element can be expressed as a means for performing a specified function without describing the corresponding structure or material. 35 U.S.C. § 112, ¶ 6. Use of the term "means" creates a presumption that the element is to be construed in accordance with § 112, ¶ 6. Cortland Line Co. v. Orvis Co., 203 F.3d 1351, 1357 (Fed. Cir. 2000). Neither party has sought to rebut this presumption.

When construing a means-plus-function claim, the court must ask two questions: 1) what is the function claimed in the element?, and 2) what structure or material disclosed in the specification performs the function claimed in the element? See e.g., Overhead Door Corp. v. Chamberlain Group, 194 F.3d 1261, 1271-73 (Fed. Cir. 1999). In making its construction of means-plus-function claims, the court cannot "[incorporate] structure[s] from the written description beyond [those] necessary to perform the claimed function." Asyst Technologies, Inc. v. Empak, Inc., 268 F.3d 1364, 1369 -1370 (Fed. Cir. 2001) (citing Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1257-58 (Fed. Cir.1999). Structural features that do not

perform the recited function "do not constitute corresponding structure and thus do not serve as claim limitations." Id. (citing Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1308-09 (Fed. Cir. 1998).

The function of claim 30, based on the plain language of this claim, is to adjust the ion output current reference value. The specification describes three modes for accomplishing this function. ITW points to passages from the specification to explain why Ion's definition, which describes all three modes, imports unnecessary structures. Pl.'s Reply Claim Construction Br. at 28-29. Based on these passages, I will not include the miswire protection circuitry and memory 118 because these two structures are not necessary for adjustment of the ion output current reference value. See `756 patent, col. 6:20-22, 40-46. ITW, citing the specification, also argues against including encoder switches. Pl.'s Reply Claim Construction Br. at 27. ITW argues that because the encoder switches serve to identify the individual emitter modules, they cannot also serve to adjust the reference value. Id. ITW does not explain how ion output current reference values could be individually adjusted - a vaunted feature of the `756 system - without such identification. The language of this claim, which tacitly recognizes the ability of the system to respond to changes around individual spaces, presumes that the emitter modules can be addressed individually. No particular reference value could be changed without an individual address. I find that the encoder switches are therefore necessary for the function at issue. However, these switches "do not perform the recited function." Asyst Technologies, 268 F.3d at 1370 (citations omitted). Consequently, it is unclear whether or not they should be included. Because the general presumption in construing patent claims is against importing limitations,[14] I

[14]See Texas Digital, 308 F.3d at 1202.

will not include the encoder switches in the construction of this claim.

Means-plus-function claim elements are construed to cover the structure disclosed in the specification and the equivalent of the disclosed structure. IMS Tech., Inc. v. Haas Automation, Inc., 206 F.3d 1422, 1432 (Fed. Cir. 2000). I will therefore construe this claim as: "the remote control circuitry that includes the IR transmitter 30, IR receive circuit 94, including IR receiver 96, IR decoder 98, and microcontroller 44; or a central controller circuitry that includes pushbutton switches 112, microcontroller 110, RS-485 communications 104, RS-485 decoder/encoder 72, microcontroller 44, and equivalents thereof."

D. Claim 32

32. An electrical ionizer according to claim 26 further comprising:

(d) **means for comparing** the absolute value of the difference between the ion output current reference value and the actual ion output current value and the actual ion output current value as determined by the comparator; and

(e) **means for causing an alarm condition to be indicated** if the absolute value of the difference is greater than a predetermined value at one or more instances of time.

1. "**Means for comparing**"

Only Ion offers a construction for this element of the claim in its proposed claim construction order. Ion proposes that the structure through which the comparison occurs is "a microcontroller and equivalents thereof." Def.'s Proposed Order re Claim Construction for the `756 patent at 7. ITW argues that the structures necessary for performance of this function also

include software. Pl.'s Reply Claim Construction Br. at 36. No software, however, is featured in the specification figures that describe the structures through which the comparison operates. Nor does ITW provide legal support for its belief that software is a structure. In a different section of its brief, ITW offers the following quotation: "'An electrical outlet enables a toaster to work, but the outlet is not for that reason considered part of the toaster.' Even though a component 'enables the claimed device to work [it] does not mean the [component] is necessarily part of the claimed structure....'" Pl.'s Reply Claim Construction Br. at 13 (quoting Asyst Technologies, 268 F.3d at 1371). Nonetheless, ITW argues that because the software enables the comparison, it should logically be identified as a structural portion of the "means."

For purposes of construing means-plus-function claims, a "corresponding structure" is "the structure [that] is clearly linked by the specification or the prosecution history to the function recited in the claim." Unidynamics Corp. v. Automatic Prods. Int'l, Ltd., 157 F.3d 1311, 1319 (Fed. Cir.1998); see also B. Braun Medical v. Abbott Laboratories, 124 F.3d 1419, 1425 (Fed. Cir.1997) ("The duty to link or associate structure to function is the quid pro quo for the convenience of employing § 112, ¶ 6 ...."). The portion of the specification cited by ITW does not mention any software. See `756 patent, col. 11:38-47. The only reference to software ITW finds in the specification figures is in the context of setting an alarm, not in comparing two values. Pl.'s Reply Claim Construction Br. at 36. Such a tangential relationship to the function of comparing two values is not "clearly linked." Unidynamics, 157 F.3d at 1319.

For these reasons I will adopt Ion's definition. The function of this element of claim 32 is: "comparing the absolute value of the difference between the ion output current reference value and the actual ion output current value determined by the comparator to a predetermined value."

The structure through which this comparison occurs is "a microcontroller and equivalents thereof."

2. "**Means for causing an alarm condition to be indicated**"

Ion and ITW agree that the function within this means-plus-function element is "causing an alarm condition to be indicated if the absolute value of the difference is greater than a predetermined value at one of more instances of time." Def.'s Proposed Order r.e. Claim Construction for the `756 patent at 8. The parties disagree on what structures are involved. Only Ion has drafted a proposed construction. Ion argues that the necessary structures are: "a microcontroller, an RS-485 encoder/decoder, and miswire protection circuitry in the emitter module, communication lines, RS-485 communications, and a microcontroller and LCD display in the system controller and equivalents thereof." Id. ITW argues that Ion has improperly lumped together those structures necessary for communicating an alarm signal and those structures needed for displaying an alarm condition. Pl.'s Reply Claim Construction Br. at 37 (emphasis original).

ITW has not suggested, however, how an alarm condition can be indicated without both communication and display. The specification briefly touches on the function in question. According to the specification, if the absolute value is greater than the predetermined value, "the emitter module is presumed to be in need of servicing. In this instance, an alarm is sent to the system controller 28." `756 patent, col. 11:45-47. Figures 4, 6, and 8 of the specification show which structures combine to ensure that the alarm signal is indicated: Microcontroller 44, within

the emitter module, uses RS-485 encoder/decoder 72 and communication lines 26 to reach RS-485 of the system controller. Microcontroller 110 of the system controller then sends "LCD data and commands" to the LCD display 116. `756 patent, fig. 6. Only by using these structures is the alarm "indicated."[15] ITW's argument that only those structures that "display" the alarm should be included in the claim construction would have the unreasonable consequence of requiring only the LCD display, which ITW does not recognize as one of the corresponding structures.

Based on the specification and the legal principles that govern construction of means-plus-function claims, this element of claim 32 shall have its undisputed function and include the following structures: "microcontroller 44, RS-485 encoder/decoder 72, RS-485 communications, microcontroller 110, LCD display 116, and equivalents thereof."

E. Claim 33

33. An ionization system for a predefined area comprising:

(a) a plurality of **emitter modules** spaced around the area, each emitter module having an **individual address** and including at least one **electrical ionizer**;

(b) a system controller for individually addressing the emitter modules using the respective individual addresses, and for controlling the emitter modules; and

(c) **communication lines** for electrically connecting the plurality of emitter modules with the system controller, wherein the individual addresses are part of the data sent on the communication lines."

[15]Because the communication lines enable rather than perform the function of indicating the alarm signal, they are not "necessary" for purposes of § 112, ¶ 6.

1. "**Emitter module**"

ITW defines the term "emitter module" as: "a self-contained assembly of electronic components circuitry, installed as a unit. The emitter module has an individual address and at least one electrical ionizer." Pl.'s Revised Proposed Order Regarding Claim Construction at 6. Ion says that it is: "at least one electrical ionizer, a microcontroller including a memory for storing a reference value, a current metering circuit, a mutlti-input A/D converter, an analog switch, a sensor antenna, an amplifier, miss-wire protection circuitry, current metering circuitry, a switching power supply, an infrared receiver, an infrared decoder, rotary encoder switches, and a watchdog timer." Def.'s Proposed Order re Claim Construction for the `756 patent at 8.

The electronics-specific dictionary definition of "module" is: "a self-contained assembly of electronic components and circuitry." American Heritage Dictionary of the English Language (4th 2000). The definition of "to emit" is: "to give or send out." Id. An emitter module, construed along these lines, would therefore be "a self-contained assembly of electronic components and circuitry that gives or sends out" ions, presumably. ITW wishes to limit this definition by requiring it to have an individual address and at least one electrical ionizer. These limitations, while consistent with the language of claim 33, would, however, generate a conflicting result when applied to claims 38 and 52: According to ITW's reply brief, each emitter module must have one, but only one, specific new feature to distinguish claims 33, 38, and 52 from the prior art. Pl.'s Rely Claim Construction Br. at 17. The term emitter module should be defined consistently throughout a patent. See Epcon Gas, 279 F.3d at 1030. The emitter module in claim 52 does not have an individual address. I will therefore not import this

feature into the claim construction because the intrinsic evidence does not support it. The dictionary definition of emitter module shall, however, have one limitation - that the ionization system has "at least one electrical ionizer" - since this limitation is found in each claim discussing "emitter module."

Ion makes five arguments for why its construction is correct. First, it argues that ITW's definition improperly excludes the word "emitter" from the definition of the term. Def.'s Opp'n Br. re Claim Construction of the ITW '756 patent at 27. My proposed claim construction does not make this error. Second, it argues that ITW's construction impermissibly includes the disclaimed hardware-based feedback systems. Id. at 31-32. The specification language that distinguished ITW's system from prior art, however, makes no mention of an emitter module. Although Ion showed why the constructions of "value" and "compare" needed to be restricted in order to avoid contradicting the intrinsic evidence, it has not done so here. Third, Ion argues that ITW's construction would render claim 52 invalid. Id. at 32. I have, however, rejected importing the language that Ion believes would create the invalidation. Fourth, Ion points to the Taiwanese patent prosecution history of the `756 system to support its own definition. Id. at 34. The two decisions Ion cites in support of its argument, Tanabe Seiyaku v. U.S. International Trade Commission, 109 F.3d 726 (Fed. Cir.), *cert. den.* 520 U.S. 1027 (1997), and Gallant v. Telebrands Corp., 35 F.Supp.2d 378 (D.N.J. 1998), do not speak to whether a foreign prosecution history should determine a claim's construction by U.S. courts. The law of patent claim construction is highly regimented. There is no suggestion that foreign prosecution evidence is intrinsic evidence. Absent a legal basis for construing it as such, I cannot consider the Taiwanese prosecution history. The parties' final disagreement regarding the term "emitter

module" is over whether the doctrine of claim differentiation would invalidate ITW's proposed construction. Since I do not accept ITW's proposed construction, this argument is moot.

For the reasons discussed above, "emitter module," for purposes of the `756 patent, means ""a self-contained assembly of electronic components and circuitry that contains at least one electrical ionizer and that gives or sends out ions." This construction shall govern construction of the term throughout the patent.

F. Claim 34

> 34. A system according to claim 33 wherein each of the emitter modules further includes **means for transmitting alarm condition** information related to at least one operating parameter of the electrical ionizer via the communication lines, the alarm condition information including the emitter module address, the system controller receiving the alarm condition information.

1. "**Means for transmitting alarm condition** [information]"

ITW states that the uncontested meaning of these words is: "software code and/or electronic circuitry that causes a signal to be sent when an alarm condition exists." Pl.'s Revised Proposed Order Regarding Claim Construction at 7. Ion, clearly disagreeing, argues that the term means "a microcontroller, an RS-485 encoder/decoder, miswire protection circuitry, and communication lines and equivalents thereof." Def.'s Proposed Order r.e. Claim Construction for the `756 patent at 9. ITW's Reply Claim Construction Brief appears to accede to some of Ion's arguments. Therein, ITW states "the means element of claim 34 should be interpreted as microcontroller 44 and software code in microcontroller 44 that creates a data stream which

includes alarm condition information, RS-485 encoder/decoder 72, and equivalents thereof." Pl.'s Reply Claim Construction Br. at 40.

The disputed element of the claim is in mean-plus-function form. As discussed above, when construing a claim, the court must ask two questions: 1) what is the function claimed in the element?, and 2) what structure or material disclosed in the specification performs the function claimed in the element? See e.g., Overhead Door Corp., 194 F.3d at 1271-73. The function, based on the plain language of the claim, is "transmitting alarm condition information." Figure 4 of the `756 patent, titled "emitter module circuit block diagram," shows that the microcontroller, the RE-485 encoder/decoder, and "miswire protection circuitry (commun. lines)" are those structures that the ion output current and balance feedback must pass through in order to reach the system controller. ITW points to the specification, however, as evidence that the miswire protection circuitry does not "perform" the claimed function. Pl's Reply Claim Construction Br. at 39. The function of the miswire protection circuitry is that which its name would suggest - to prevent miswiring. `756 patent, col. 6:40-46.

Accordingly, the proper construction for this claim is: "a microcontroller 44, an RS-485 encoder/decoder 72, and equivalents thereof."

G. Claim 39

> 39. A system according to claim 33 wherein each emitter module further including a stored ion output current reference value, and the system controller includes **means for individually adjusting the stored ion output current reference value of each emitter module**.

1. "**Means for individually adjusting the stored ion output current reference value of each emitter module**"

Both parties offered convoluted and contradictory proposed constructions for claim 39. ITW, in its reply brief, abandoned the construction it offered in its Revised Proposed Claim Construction Order and so I will not repeat it. Ion, in its proposed claim construction order, suggests a kitchen-sink of options that are noticeably more involved than the construction it proposes and defends in its brief. Def.'s Proposed Order re Claim Construction for the `756 patent at 10. The parties agree that the function at issue is the individual adjustment of the stored ion output current reference value of each emitter module. Their dispute arises from the question of which structures are involved in this means-plus-function claim.

Ion asserts that claim 39 necessarily uses the following structures: "the remote control transmitter 30, including two rotary encoding switches 32 and pushbutton switches 34, and in the controller IR receiver 126 and IR decoder 128, pushbutton switches 112, microcontroller 110, memory 118, RS-485 communications 104 communicating with the ionizer miswire protection circuitry 70, RS-485 decoder/encoder 72, and microcontroller 44." Def.'s Opp'n Br. re Claim Construction of the `756 patent at 38.

Rather than proposing a prose claim construction, ITW presents a graph that it believes defines the disputed "means." This graph includes the following structures: in Mode 2, "remote control transmitter 30, IR receiver 126, IR decoder 128, microncontroller 110, RS-485 communications 104, RS-485 encoder/decoder 72, microcontroller 44, and memory 150;" in Mode 3, "pushbutton switches 112, microcontroller 110, RS-485 communications 104, RS-485 encoder/decoder 72, microcontroller 44, and memory 150." Pl.'s Reply Claim Construction

Brief at 32-33.

Proper construction of this claim requires two steps. First, there must be recitation of the function. The function is to adjust individually the stored ion output current reference value of each emitter module. The specification describes three modes for accomplishing this function, which are identical to those at issue in claim 30. ITW repeats its arguments concerning Ion's improper inclusion of miswire protection circuitry, memory 118, and encoder switches that it made regarding the earlier claim. Pl's Reply Claim Construction Br. at 30-32. For the reasons articulated above, I accept ITW's argument.

Accordingly, those structures that support the function of individually adjusting the stored ion output current reference value are: "the remote control transmitter 30 (including pushbutton switches 34), IR receiver 126, IR decoder 128, pushbutton switches 112, microcontroller 110, RS-485 communications 104, RS-485 encoder/decoder 72, microcontroller 44, and equivalents thereof."

H. Claim 52

52. An ionization system for a predefined area comprising:

(a) a plurality of emitter modules[16] spaced around the area, each emitter module including:

(i) at least one electircal ionizer, and

(ii) a **power mode setting for setting the emitter module in one of a plurality of different operating power modes**;

[16]This term shall have the same meaning throughout the patent. It will therefore have the same meaning as that discussed in claim 33.

(b) a system controller for controlling the emitter modules; and

(c) **electrical lines** for electircally connecting the plurality of emitter modules with the system controller, the electrical lines providing both communicaiton with, and power to, the emitter modules.

1. "**Power mode setting for setting the emitter module in one of a plurality of different operating power modes**"

ITW offers the following construction: "an operating mode that defines the type of waveform voltage signal that is used to cause an ion emission." Pl.'s Revised Proposed Order Regarding Claim Construction at 8. Ion proposes that this element of the claim means: "a setting that can adjust a pulse width of a signal that supplies power." Def.'s Proposed Order re Claim Construction for the `756 patent at 11. The parties' dispute centers around the form of the high voltage signal that, when applied to an emitter, creates ions. This signal has a waveform that determines the mode in which the ions are created. There are different types and widths of waveforms. The parties disagree about how the claim construction should recognize the various manifestations a waveform can take. Each accuses the other of unreasonably selecting a narrower interpretation. Pl's Reply Claim Construction Br. at 25; Def.'s Opp'n Br. re Claim Construction of the `756 patent at 36.

Helpfully, ITW provides an entry from a technical dictionary. The IEEE Standard Dictionary of Electrical and Electronics Terms defines "waveform" as: "[a] manifestation or representation or a visualization of a wave, pulse, or transition." IEEE Standard Dictionary of Electrical and Electronics Terms (6th 1996) (parentheticals omitted). This definition, under Texas Digital, presumably represents the meaning of waveform as understood by one of ordinary skill in the art. It is broad enough to encompass both the type and width of a waveform.

Accordingly, the claim shall be construed as "a setting that defines the type or width of the high voltage signal that supplies power."

II. Ion's `127 Patent: "Self-Regulating Air Ionizing Apparatus"

There are three claims within this patent that contain disputed terms. All of these terms are in means-plus-function format. Once again, those terms disputed by Ion are marked with an underline, while those terms contested by ITW are marked in bold. Only disputed claim terms shall be construed and each disputed term shall be construed only once. Unless otherwise indicated, the initial construction shall apply to the patent as a whole. See Epcon Gas, 279 F.3d at 1030.

A. Claim 1

> 1. Air ionizing apparatus having at least one electrode exposed to air which is to be ionized, a direct current high voltage generator connected to said electrode to apply sustained high voltage of a predetermined polarity thereto at least for limited periods of time, a ground return electrical resistance through which a flow of electrical charges of opposite polarity is conducted away from said electrode and siad high voltage generator at a rate corresponding to the rate of air ion production by said electrode, and means for preventing outflow of electrical charges of said predetermined polarity from said electrode through said resistance, wherein the improvement comprises:
>
> > **sensing means** for producing an electrical feedback signal, said sensing means being connected to said resistance to said variations of said flow of electrical charges of opposite polarity by sensing variations for the voltage drop across said resistance whereby the feedback signal has a magnitude that varies in correspondence with variations of the rate of production of ions of said predetermined polarity at said electrode, and

> **voltage adjusting means** for receiving said feedback signal and for causing said high voltage generator to apply higher voltage to said electrode in response to a decrease of said feedback signal and to apply lower voltage to said electrode in response to an increase of said feedback signal.

1. "**Sensing means**"

Ion argues that the corresponding structure for this means-plus-function element is "an amplifier and equivalents thereof." Ion's Proposed Order re: Claim Construction for Ion Systems' Patents at 2. ITW says it is "amplifier 104 and equivalents thereof." ITW's Proposed Order Regarding Claim Construction at 2.

The function of the sensing means is to produce an electrical feedback signal. This function is apparent from the claim language and uncontested. The parties' dispute centers on whether or not the amplifier must be part of a summing circuit. In the preferred embodiment described in the specification, the corresponding structure is amplifier 104, which is part of a summing circuit. `127 patent, col. 9:3-7. Both parties recognize, however, that the patent's specification also includes an alternative embodiment that performs the recited function. ITW's Opposition Claim Construction Br. re the '127 patent at 14; Ion's Reply Claim Construction Br. re the 127 patent at 3. This alternative embodiment does not involve a summing circuit: "embodiments of the invention may be construed without the summing circuit 33 by providing separate return current resistors 103 for each high voltage generator 28 and 29 which separately provide feedback signal inputs to the two voltage control and feedback circuits 31 and 32." `127 patent, col. 9:16-21.

"When multiple embodiments in the specification correspond to the claimed function,

proper application of §§ 112, ¶¶ 6 generally reads the claim element to embrace each of those embodiments." Micro Chem. Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258-1259 (Fed. Cir. 1999) (citing Serran v. Telular Corp., 111 F.3d 1578, 1583 (Fed. Cir. 1997)). In Micro Chemical, the Federal Circuit reversed a district court's claim construction because the lower court had limited the claim to the structure disclosed in the preferred embodiment despite the specification's presentation of an alternative embodiment. Id. Accordingly, any construction of the term "sensing means" must reflect those structures disclosed in both the preferred embodiment and any alternative embodiments.

In response to Ion's argument about the multiple embodiments for a "sensing means," ITW correctly notes that, pursuant to § 112, ¶ 6, a means-plus-function construction must be defined by specific structures disclosed in the specification. ITW's Opposition Claim Construction Br. re the '127 patent at 14. Although the '127 patent discusses multiple embodiments, the only specific structure it discloses for "sensing" is amplifier 104. Under § 112, ¶ 6, I cannot accept Ion's proposed construction insofar as it fails to identify a specific structure. At the same time, Micro Chemical requires that the claim construction reflect all embodiments disclosed in the specification. As quoted above, the specification envisions separate return current resistors as an alternative to the summing circuit of which amplifier 104 is a part. For these reasons, the term "sensing means" shall be: "amplifier 104 and equivalents thereof, or, in the alternative, separate return current resistors 103."

2. "**Voltage adjusting means**"

Ion proposes that the term "voltage adjusting means" corresponds to "a positive or negative voltage control and feedback circuit and equivalents thereof." Ion's Proposed Order re: Claim Construction for Ion Systems' Patents at 3. ITW argues that it includes: "comparators 117 or 139 and their inputs and outputs and equivalents thereof. The comparator inputs are: 1) a positive or negative voltage control signal, and 2) a combined alternating current ("AC") based voltage signal and return current feedback signal. The comparator output is a trigger signal." ITW's Proposed Order Regarding Claim Construction at 2.

The undisputed function of this term is "to receive the feedback signal and to adjust the voltage output of the power supplies in response." Markman Hr'g Tr. at 105. The parties do not contest this construction of the function.

The dispute is over which structures correspond to this function. The structures at issue have two functions: to receive the feedback signal and to make an adjustment in response. Ion argues that unidentified voltage control and feedback circuits are the relevant structures. The specification repeatedly recognizes circuits 31 and 32 as the entities that perform the function in question: "[t]he voltage control and feedback circuits 31 and 32 function to maintain predetermined rates of ion production at each electrode 24 and 26 by sensing the return current flows and adjusting the voltages produced by the high voltage generators 28 and 29 as needed to maintain the return currents substantially constant." `127 patent, col. 8:49-54. These circuits are not, however, "structures, methods, or acts" for purposes of § 112, ¶ 6. Rather, they each comprise various structures, not all of which receive the feedback signal and adjust the power supply. Ion's proposal therefore cannot be correct.

Close reading of the specification reveals that two different types of structures "receive

the feedback signal" generated by the sensing means. Amplifier 112 is the first structure to receive this signal. `127 patent, col. 9:47-49. Comparator 117 also "receives the previously described positive voltage control signal...." `127 patent, col. 9:64-68; 10:7-12. Both the amplifier and the comparator are part of the voltage control and feedback circuit. Only the comparator, however, appears to "adjust the voltage output of the power supply" in response to information received from the sensing means. `127 patent, col. 9:59-64. ITW attempts to identify various feedback signals as relevant structures. Under Asyst Technologies, the corresponding structure "must actually perform the recited function, not merely enable the pertinent structure to operate as intended...." 268 F.3d at 1371. Those signals identified by ITW do not perform the recited function. Rather, they enable it. Accordingly, they cannot be included in the claim's construction. The specification recognizes that comparator 139 is analogous to comparator 117. `127 patent, col. 11:43-46. For this reason, the corresponding structure to the voltage adjusting means is: "comparator 117 or comparator 139 and equivalents thereof." This construction also applies to claim 14's term "means for varying the high voltage."

B. Claim 7

> 7. Air ionizing apparatus having first and second electrodes exposed to air which is to be ionized, a first high voltage generator coupled so said first electrode to apply positive high voltage thereto, each of said high voltage generators having an independently adjustable high voltage output, a ground return electrical resistance through which electrical charges of opposite polarity are conducted away from said first and second high voltage generators at a rate corresponding to the rate of air ion production by the electrode that is coupled to the generator, and **control means** for transmitting input current to each of said high voltage generators, wherein said **control means** actuates said first and second high voltage generators intermittently and alternately, wherein the improvement comprises:

sensing means for producing a first electrical feedback signal which has a magnitude that varies in correspondence with variations of the voltage drop across said electrical resistance and which is indicative of ion output at said first electrode and for producing a second electrical feedback signal which has a magnitude that varies in correspondence with variations of the voltage drop across said electrical resistance and which is indicative of ion output at said second electrode.

first and second voltage adjusting means for respectively receiving said first and second feedback signals, said first voltage adjusting means being connected to said first high voltage generator and being responsive to said first feedback signal that originates therefrom and wherein said first voltage adjusting means causes said first high voltage generator to apply higher voltage to said first electrode in response to a decrease of said first feedback signal and to apply lower voltage to said first electrode in response to an increase of said first feedback signal, said second voltage adjusting means being connected to said second high voltage generator and being responsive to said second feedback signal that originates therefrom and wherein said second voltage adjusting means causes said second high voltage generator to apply higher voltage to said second electrode in response to a decrease of said second feedback signal and to apply lower voltage to said second electrode in response to an increase of said second feedback signal.

and wherein said **sensing means** includes a summing circuit connected to combine said electrical charge flows from both of said first and second high voltage generators and to transmit the combined charge flows to said electrical resistance whereby said voltage adjusting means adjusts the voltages produced by each generator during operation thereof to compensate for ion neutralization at the electrode connected to the other of said generators.

1. "**Control means**"

Ion argues that "control means" "is a power supply and a timing pulse generator and equivalents." Ion's Proposed Order re: Claim Construction for Ion Systems' Patents at 3-4. ITW asserts that this term corresponds to an "[a]lternating current power supply 34, and pulse generator 36 that outputs voltage control signals 51 and 52 on lines 48 and 49 and equivalents

thereof." ITW's Proposed Order Regarding Claim Construction at 3.

The function of this claim term is to "[transmit] input current" to a high voltage generators and to "actuate" the high voltage generators intermittently and alternately. Ion argues that the function is only "transmitting input current." Ion's Reply Claim Construction Br. re the `127 patent at 9. The language of claim 7, however, makes it clear that another function of the control means is also "to actuate."

Bearing both of these functions in mind, I will now consult the specification to determine which structures should be included in the claim construction. See Unidynamics, 157 F.3d at 1319 (for purposes of construing means-plus-function claims, a "corresponding structure" is "the structure [that] is clearly linked by the specification or the prosecution history to the function recited in the claim"). Both parties agree that the low voltage power supply 34 and timing pulse generator 36 "transmit" the input current. Ion's Reply Claim Construction Br. re the `127 patent at 9; ITW's Opp'n Claim Construction Br. re the `127 patent at 22; see also `127 patent, col. 5:32-37. The specification relates that timing pulse generator 36 also "actuates and deactuates" those emitters that ultimately reach the generator, as alluded to in the claim language. `127 patent, col. 5:34-36.

Two specific structures, the low voltage power supply 34 and timing pulse generator 36, are "clearly linked" to the recited function. ITW provides no textual support for why the control signals and power lines that it proposes are similarly linked. Nor does the specification show that these additional materials perform, rather than enable, the recited function. For this reason, those structures that correspond to the "control means" are "low voltage power supply 34, pulse generator 36, and equivalents thereof."

2. "**First and second voltage adjusting means**"

The only difference between the construction for this claim term and the "voltage adjusting means" discussed above is that the corresponding structures are: "comparator 117 *and* comparator 139 and equivalents thereof." The function of theses terms remains the same.

A. Claim 18

> 18. In apparatus for ionizing air, the combination comprising first and second air ionizing electrodes, first and second high voltage sources connected to said first and second electrodes respectively, each of said high voltage sources having a ground return terminal which transmits an outflow of electrical charges that are of opposite polarity from the high voltage supplied by the source and which outflow has a magnitude that corresponds to the rate of air ion generation by the electrode to which the source is connected during periods when the source is actuated, **means for intermittently and alternately actuating said first and second high voltage sources**, an electrical resistance, summing circuit means for combining charge outflows from said ground return terminals of both of said high voltage sources and for transmitting the combined charge outflows through said electrical resistance, sensing means for producing a feedback signal having a magnitude that varies in correspondence with variations of the voltage drop across said electrical resistance, and voltage adjusting means for receiving said feedback signal and for causing each high voltage source to vary the voltage output thereof in inverse relationship to variations of said feedback signal during periods when the high voltage source is actuated.

1. "**Means for intermittently and alternately actuating said first and second high voltage sources**"

Ion asserts that the only structure necessary to perform the recited function is "a pulse generator." Ion's Reply Claim Construction Br. re the `127 patent at 11. ITW argues that the corresponding structures are: pulse generator 36, voltage control signals 51 and 52, lines 48 and 49, and equivalents thereof. ITW's Proposed Order Regarding Claim Construction at 8.

The uncontested function of this element of claim 18 is "intermittently and alternately actuating" the first and second high voltage sources.

ITW's own brief belies its argument that lines 48 and 49 *perform* the "actuation" in question. Rather, ITW notes that the means "must be pulse generator 36 which outputs voltage control signals 51, 52 on lines 48, 49." ITW's Opp'n Claim Construction Br. re the `127 patent at 26. The lines are passive, merely carrying a signal. Under Asyst Technologies, they should therefore be omitted from the claim construction. 268 F.3d at 1370-71.

The more difficult question is whether the voltage control signals cited by ITW "actuate" the high voltage sources. Ion argues they do not. Rather, Ion avers, "[t]he pulse generator performs the function of actuating the high voltage sources by sending an output signal - the signal itself is at most a product of the function, but not part of the corresponding structure itself that performs the function." Ion's Reply Claim Construction Br. re the `127 patent at 11. Ion's position is supported by the specification: When discussing the use of voltage control signal 51 and 52, the specification notes the existence of an alternative pulse timing circuit in the prior art. `127 patent, col. 6:20-23. Although the specification does not appear to identify this circuit as an alternative embodiment, this passage suggests that signals 51 and 52, while they might be the means by which the pulse generator actuates the voltage sources, are not necessary to perform the function.

The dictionary definition of "actuate," to the extent that it reflects the term's ordinary and accustomed meaning, also supports Ion's argument for limiting the claim construction to the pulse generator. The dictionary definition for "actuate" is "[t]o put into motion or action; activate." American Heritage Dictionary of the English Language (4th 2000). "Activation" is a

step, rather than a process. The finite nature of this verb cannot be reconciled with the ongoing activity of the voltage control signals. The specification reveals that the pulse generator "select[s]" the voltage level for signals 51, 52, the durations of the voltage drops of each signal, and an off-time interval between each voltage drop. `127 patent, col. 6:12-20. These selections "put into motion" the high voltage sources. In contrast, the voltage control signals carry out the motion once it is initiated, or activated, by the pulse generator.

Ion's argument concerning the corresponding structures, while persuasive, nonetheless ignores the language of § 112, ¶ 6, which requires that the court construe means-plus-function claims to "cover the corresponding structure, material or acts *described in the specification*...." (emphasis added); see also Valmont Industries, 983 F.2d at 1042 (citation omitted). Ion's proposition that the claim be construed to correspond to any pulse generator not only runs afoul of § 112, ¶ 6, but also obviates the need for the customary appendage "and equivalents thereof." Ion's construction would therefore be illogical.

For these reasons, the disputed claim term shall have its undisputed function and correspond to following structures: "pulse generator 36 and equivalents thereof."

CONCLUSION

The discussion and analysis presented above represents this Court's construction of the parties' disputed terms.[17]

[17]My law clerk Sabrina Fève requests that I disclose that she now despises patent law. I cannot believe that anyone who displays such competence in a field of inquiry feels so vehemently. Her response must be less than forthcoming: the traditional line between love and hate lives on.

O R D E R

AND NOW, this day of March, 2003, upon consideration of the briefs, exhibits, supplemental filings, and oral argument presented by the parties in conjunction with the Markman hearing in which they all participated, it is hereby **ORDERED** that the meaning and scope of the patent claims asserted to be infringed and presented by the parties for construction are determined as set forth in the foregoing Memorandum.

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Anita B. Brody, J.

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