United States District Court,
S.D. Texas, Houston Division.

CAT TECH INC,
Plaintiff.
v.
TUBEMASTER, INC,
Defendant.

Oct. 30, 2006.

Barden Todd Patterson, Craig V. Depew, Clark Depew et al., David Michael Haugen, Henry Mark Pogorzelski, Patterson & Sheridan, LLP, Houston, TX, for Plaintiff.

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CLAIM CONSTRUCTION MEMORANDUM AND ORDER

KEITH P. ELLISON**, District Judge.**

Cat Tech, Inc. ("Cat Tech") has accused Tubemaster, Inc. ("Tubemaster") of infringing United States Patent No. 6,905,660 ("the '660 patent"). This case is now before the Court for a determination of the meaning of various disputed terms of the '660 patent.

Based on a review of the parties' filings, the intrinsic evidence of record, and the oral arguments presented to the Court, the Court hereby **ADOPTS** the following claim constructions.

I. BACKGROUND

The '660 patent describes a method for loading catalyst particles into the tubes of multi-tube chemical reactors. Multi-tube reactors are used by chemical manufacturers to produce various chemical products. The reactors typically contain thousands of long vertical tubes into which solid catalyst particles are loaded. Then, when gaseous reactants are released into the tubes and come into contact with the catalysts, the reactants undergo chemical reactions and become the desired chemical products.

It is important that the catalyst particles be loaded into the reactor tubes evenly and consistently in order to prevent several particles from wedging together, or "bridging." When bridging occurs, empty spaces accrue below the wedged particles in the reactor tubes. This leads to a variation in density among the tubes which can affect the chemical reactions and reduce the overall efficiency of the operation. The '660 patent introduces a method of loading reactor tubes that prevents bridging and that can be reconfigured to load reactors with varying sizes of tubes.

Cat Tech now claims that Tubemaster is employing a method of loading multi-tube chemical reactors that infringes independent claims 3 and 4, as well as dependent claims 5, 6, and 7, of the '660 patent. There are five remaining disputed claim terms that occur in claims 3, 4, and 5. Each of these claims is set forth below, with the disputed terms bolded:

3. A method for loading solid particles into a multi-tube reactor, comprising:

a) positioning a plurality of discrete plates **on top of** an upper tube-sheet of the multi-tube reactor, whereby the plates rest on and substantially cover at least a portion of the upper tube-sheet and provide **a spacing** between adjacent plates having **a width not greater than the smallest dimension of a single particle to be loaded** into the multi-tube reactor, the **spacing** for collecting dust and partial particles, wherein each plate comprises: an aperture that corresponds to a corresponding reactor tube and has a diameter not greater than 95% of the inner diameter of the corresponding reactor tube and not smaller than 1.1 times the greatest dimension of a single particle to be loaded into the corresponding reactor tube; and **means for holding the aperture in correspondence with the corresponding reactor tube;**

b) pouring the particles over at least a portion of the plurality of plates covering the tube-sheet;

c) sweeping the particles through the apertures in the plates into the corresponding reactor tubes, whereby the particles fill the reactor tubes in a uniform manner and bridging is avoided;

d) removing residual particles and any dust remaining on the plates and in the **spacing** between adjacent plates; and

e) removing the plurality of plates.

4. A method for loading solid particles into a multi-tube reactor, comprising:

a) positioning a plurality of discrete plates **on top of** an upper tube-sheet of the multi-tube reactor, whereby the plates substantially cover at least a portion of the upper tube-sheet and each plate has a shape that provides **a spacing** between adjacent plates having **a width not greater than the smallest dimension of a single particle to be loaded** into the multi-tube reactor, the **spacing** for collecting dust and partial particles;

b) pouring the particles over at least a portion of the plurality of plates covering the tube-sheet;

c) sweeping the particles through apertures in the plates into reactor tubes of the multi-tube reactor, whereby a size of the apertures is selected for filling the reactor rubes with the particles in a uniform manner and avoiding bridging;

d) removing residual particles and any dust remaining on the plates and in the **spacing** between adjacent plates; and

e) removing the plurality of plates.

5. The method of claim 4, wherein the position the plurality of plates comprises inserting **fixing means** of the plates into a top of reactor tubes of the multi-tube reactor to provide for alignment of apertures in the plates with corresponding reactor tubes.

II. CLAIM CONSTRUCTION

A. Legal Standard

Claim construction is a matter of law, and thus the task of determining the proper construction of all disputed claim terms lies with the Court. Markman v. Westview Instruments, Inc., 517 U.S. 370, 372, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Claim construction must begin with, and remain focused on, "the language of the claims themselves, for it is that language the patentee chose to use to 'particularly point[ ] out and distinctly claim[ ] the subject matter which the patentee regards as his invention.' " Interactive Gift

Express, Inc. v. Compuserve, Inc., 256 F.3d 1323, 1331 (Fed.Cir.2001) (quoting 35 U.S.C. s. 112). There is a heavy presumption that claim terms have their ordinary and customary meaning. Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc., 262 F.3d 1258, 1268 (Fed.Cir.2001). The ordinary and customary meaning of a claim term is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips v. AWH Corp.,* 415 F.3d 1301, 1313 (Fed.Cir.2005) (en banc).

In some cases, the ordinary meaning of a claim term as understood by a person of skill in the art is readily apparent. In such cases, claim construction requires only "the application of the widely accepted meaning of commonly understood words." *Id.* at 1314; *see* Brown v. 3M, 265 F.3d 1349, 1352 (Fed.Cir.2001) (holding that disputed claims did "not require elaborate interpretation"). On the other hand, when the meaning of a term is not immediately apparent, or when a patentee uses a term idiosyncratically, a court must look to "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean." *Phillips,* 415 F.3d at 1314 (quoting Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111, 1116 (Fed.Cir.2004)). Such sources include the text of the claims themselves, the remainder of the specification, and the patent's prosecution history. *Phillips,* 415 F.3d at 1314 (*quoting* Innova, 381 F.3d at 1116). FN1

FN1. A fourth relevant source is "extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips,* 415 F.3d at 1314 (*quoting* Innova, 381 F.3d at 1116). However, because neither Cat Tech nor Tubemaster submitted extrinsic evidence regarding any of the disputed claim terms, the Court need not address the effect of extrinsic evidence on claim construction.

First, the claims themselves "provide substantial guidance as to the meaning of particular claim terms." *Phillips,* 415 F.3d at 1314. The most useful aspect of the claims is the context that they provide for the disputed terms. For example, another word used in the claim may make the scope of the disputed term claim clear. *See, e.g., id.* ("[T]he claim in this case refers to 'steel baffles,' which strongly implies that the term 'baffles' does not inherently mean objects made of steel."). In addition, other claims in the patent at issue can shed light on the meaning of a disputed term when they contain the disputed term as well. *Phillips,* 415 F.3d at 1314.

Second, a court may reference the specification to aid in construction of a disputed claim term. In fact, a person of ordinary skill in the art is "deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* The specification "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996)). Nonetheless, while the specification may assist the court in interpreting the disputed claim language, the court must take care to avoid reading "limitations appearing in the specification ... into [the] claims." Intervet Am., Inc. v. Kee-Vet Labs., Inc., 887 F.2d 1050, 1053 (Fed.Cir.1989); *see also* Amgen, Inc. v. Hoechst Marion Roussel, Inc., 314 F.3d 1313, 1325 (Fed.Cir.2003).

A third source of assistance to a court interpreting disputed claim language is the prosecution history of the patent. *See Phillips,* 415 F.3d at 1317 ("we have held that a court 'should also consider the patent's prosecution history, if it is in evidence' " (quoting *Markman,* 52 F.3d at 980)). The prosecution history consists of the record of the proceedings before the U.S. Patent and Trademark Office ("PTO"), including the prior art cited during the examination of the patent. This history demonstrates how the inventor understood the invention, and it can help the court determine "whether the inventor limited the invention in the course of the prosecution, making the claim scope narrower than it would otherwise be." *Phillips,* 415 F.3d at 1317 (citing Vitronics, 90 F.3d at 1582-83). "Yet because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it

often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Phillips,* 415 F.3d at 1317.

B. Disputed Terms

1. "Spacing"

Cat Tech's position is that the term "spacing" does not require construction by the Court because its ordinary meaning is readily apparent. However, in the event that the term does require construction, Cat Tech urges the Court to adopt "at least one space" as the construction. Tubemaster, on the other hand, argues that the Court should construe the term as "a uniform gap."

The term "spacing" as it used in the disputed claims is somewhat opaque in light of its dictionary definition, which is "the fixing or arranging of spaces." Dictionary.com Unabridged (v.1.0.1), based on Random House Unabridged Dictionary (Random House, Inc.2006). That definition adds a modicum of confusion to the claim, and thus there is a need for construction of this term.

However, the dispute over this term can be resolved by looking almost exclusively to the language of the claims themselves. The disputed term appears six times in the three relevant claims, and in four of those six instances, the word "spacing" is immediately followed by the words "between adjacent plates." Thus, it is clear that the term "spacing" is meant to refer to the space, or gap, between the plates when they are placed over the reactor tubes. Had the claims utilized the word "space" or "gap" instead of "spacing," the confusion over the term likely would have been eliminated. When "gap" is substituted for "spacing" throughout the claims, the meaning of the claims does not appear to change. In fact, the specification uses the words "gap" and "space" repeatedly and interchangeably. A person of ordinary skill in the art would understand the word "spacing" to mean "gap." Thus, "gap" is an appropriate construction of this disputed claim term.

Cat Tech's proposed construction of "at least one space" does not adequately clarify the term "spacing" because "space" in the abstract is not an objective unit of measurement. Spaces can be of varying sizes, and there is no way to quantify whether a space is just one space or two smaller spaces combined. Thus, the Court rejects "at least one space" as a construction.

Tubemaster's proposed construction of "a uniform gap" creates another problem. It seeks to add an adjective that limits the term. The word "uniform" dictates the relative size of the spaces between plates, requiring that all spaces be equal. Tubemaster points out that, throughout the specification, the patent refers to uniformity in spacing. For example, the specification remarks that, as a result of polygonal plates, "inter-plate spaces will always be *uniform*." ' 660 Patent col.4 l.3-4 (emphasis added). In addition, in the example contained in the specification, hexagonal plates resulted in "*regular* gaps of 3 mm width left between neighbouring loading devices." Id. col.5 l.15-16 (emphasis added).

Nevertheless, it appears to the Court that the uniformity or regularity of the gaps described in the specification is a byproduct of the polygonal and hexagonal shape of the plates described, rather than an independent requirement for the gaps themselves. Stated another way, the shape of the plates dictates the regularity or irregularity of the gaps, rather than the reverse. FN2 But Tubemaster asks the Court to construe "spacing" in a way that would import a limitation on the shape of the plates, a limitation that is noticeably absent from the claims themselves. Claims 1 and 2 specifically require the plates to be polygonal in shape, while claims 3 through 7, those at issue in this case, do not. Thus, because the Court is of the opinion that the uniformity (or non-uniformity) of the gaps between plates are a consequence of the shape of the plates themselves, and claims 3 through 7 do not require the plates to be any particular shape, the proposed construction requiring the gaps to be uniform is rejected. The appropriate construction of the term "spacing" is simply "gap."

FN2. Tubemaster takes issue with this conception of the patent and points to Cat Tech's "Response to Office Action Dated August 16, 2004," in which Cat Tech stated that "the claims define the invention based on spacing between adjacent plates and not whether the shape of the plate used to achieve this spacing is, or is not, polygonal." (Def.'s Resp. Claim Constr. Br. Ex. D p. 7.) Tubemaster understands this statement to mean that the essence of Cat Tech's invention is the gap, rather than the shape of the plates.

The Court does not disagree with this understanding. However, the Court believes that the essence of the invention is the *size* of the gaps, rather than the *uniformity* of the gaps. In the same paragraph cited by Tubemaster, Cat Tech refers to the portion of the specification saying "the gap was *sufficiently small* as not to allow any whole catalyst particles to enter, but allow small chips and broken pieces of catalyst." Id. (emphasis added). This focus on the size of the gap suggests that as long as every gap is the appropriate size (i.e., smaller than a whole catalyst particle), the uniformity of the gaps is irrelevant. For example, a circular plate could be covered by the patent despite the non-uniformity of the resulting gaps as long as all of the gaps were the appropriate size. Thus, the *size* of the gaps is more important to the patent than the shape of the plates, but the regularity or irregularity of the gaps remains a consequence of the shape of the plates.

2. "A width not greater than the smallest dimension of a single particle to be loaded"

The term "a width not greater than the smallest dimension of a single particle to be loaded" does not require elaborate construction. This is one such case where the ordinary meaning of a claim term as understood by a person of skill in the art is readily apparent. While perhaps complicated at first glance, the term is actually quite precise. It defines a width measurement by reference to the smallest dimension of another particle. None of the words contained in the term is vague or confusing. A jury could understand this term without any further elaboration. Thus, because the meaning of this term requires only "the application of the widely accepted meaning of commonly understood words," *Phillips,* 415 F.3d at 1314, the Court declines to construe this term.

3. "On top of"

Cat Tech's position is that the term "on top of" does not require construction by the Court. In the event that the term does require construction, Cat Tech urges the Court to adopt "above" as the construction. Tubemaster, on the other hand, argues that the Court should construe the term as "directly on top of."

This disputed claim term does require construction by the Court. Claims 3 and 4 describe "positioning a plurality of discrete plates *on top of* an upper tube-sheet," but the ordinary meaning of "on top of" as understood by a person of skill in the art is not readily apparent. Specifically, it is not clear whether or not "on top of" requires physical contact between the plates and upper tube-sheet. This is the difference between the competing proposed constructions: Cat Tech argues that contact is not necessary, while Tubemaster argues that it is.

First, the Court notes that Tubemaster's proposed construction, "directly on top of," does not adequately embody the substantive construction that it seeks. It is clear that Tubemaster's position is that "on top of" should be construed as requiring contact, FN3 but the word "directly" does not necessarily connote physical contact. In fact, there would have to be additional construction of the word "directly" to arrive at the conclusion that it required physical contact. Thus, even if the Court were to construe "on top of" to require that the plates be in physical contact with the upper tube-sheet, it would not adopt Tubemaster's proposed construction.

FN3. For example, in several places in its Responsive Claim Construction Brief, Tubemaster describes the plates as "directly on top of and resting on," or "resting directly on top of and in contact with" the tube sheet. (Def.'s Resp. Claim Construction Br. 25.)

However, the language of the claims themselves reveals that the term "on top of" cannot contain a physical contact requirement. Claim 3 explains that the plates are positioned "on top of" an upper tube-sheet, "whereby the plates *rest on* and substantially cover at least a portion of the upper tube-sheet" (emphasis added). Similarly, claim 4 also provides that the plates are positioned "on top of" an upper tube-sheet, but it omits the "rest on" language, stating only "whereby the plates substantially cover at least a portion of the upper tube-sheet." Construing "on top of" to contain a physical contact requirement would therefore render the words "rest on" in claim 3 superfluous. Furthermore, doing so would eliminate an express difference between claims 3 and 4. Such a construction cannot be correct.

The specification also supports the conclusion that the term "on top of" does not require physical contact. If it did, two preferred embodiments would be excluded. First, one of the preferred embodiments in the specification explains that an "insert ... can be made to carry a shoulder which will allow *a space between the polygonal plate and the upper tube-sheet*." '660 Patent col.4 ll.7-10 (emphasis added). Second, Figure 2 of the '660 patent illustrates an embodiment in which the plates (identified by the number 8) are in contact with the reactor tubes (identified by the number 3), but *not* in contact with the upper tube-sheet (identified by number 5). FN4 Id. fig.2. Thus, in order to preserve the consistency of the claims and the preferred embodiments in the specification, "on top of" cannot be construed as requiring contact.

FN4. Despite the space between the plates and upper tube-sheet illustrated in Figure 2, Tubemaster maintains that, during the patent prosecution, Cat Tech was forced to deny that such a space could exist in order to distinguish its invention from prior art. However, the statements to which Tubemaster refers were made during the prosecution of the '660 patent's *parent* patent application, U.S. Patent No. 6,409,977. All of the claims in the parent patent provide that "each plate *rests on*" the upper tube-sheet-language that is absent from claim 4 of the '660 patent. This indicates that "rest on" is the language requiring physical contact, rather than "on top of."

The Court therefore adopts "above" as the proper construction of the disputed claim term "on top of." "Above" describes the correct positioning of the plates in relation to the upper tube-sheet while not requiring physical contact between the two.

4. "Means for holding the aperture in correspondence with the corresponding reactor tube"

The parties agree that the term "means for holding the aperture in correspondence with the corresponding reactor tube" (hereinafter "means for holding") is a means-plus-function term that requires construction by the Court. *See Phillips,* 415 F.3d at 1311 (explaining that a means-plus-function claim requires construction when it is a purely functional limitation that does not reference the structure that performs the function). A means-plus-function term must be construed according to 35 U.S.C. s. 112, paragraph 6, which requires that a court identify the relevant function and the corresponding necessary structure described in the specification. In this case, the parties agree that the proper construction of the relevant function is "holding the aperture in correspondence with the corresponding reactor tube." All that is left, then, is for the Court to identify and construe the structure described in the specification that is responsible for this function.

There are several components of "means for holding" on which Cat Tech and Tubemaster agree. They agree that an "insert" could be "a spike, a pipe or a half-pipe," and they agree that the holding means can be "either individual to each hole or common to the entire device." FN5 They also agree that whatever construction the Court adopts, it must encompass equivalent structures.FN6 However, the primary source of disagreement over the proper construction of "means for holding" is what physical form the means can or must take. Tubemaster proposes that the structure could be "a screw, a bolt, or an insert." Cat Tech, on the other hand, urges that the structure can be *only* an insert (not a screw or a bolt), and that the insert *must* take a particular form: "extending from the edge of the aperture and insertable into the top of the reactor tube to be loaded."

FN5. Agreement on this issue is not reflected in the parties' claim construction briefs, but was reported to the Court at the *Markman* hearing.

FN6. This construction is required by 35 U.S.C. s. 112, paragraph 6, which provides that a means-plus-function term "shall be construed to cover the corresponding structure, material, or acts described in the specification *and equivalents thereof*." 35 U.S.C. s. 112 para. 6 (2006) (emphasis added).

The relevant passage from the specification is as follows:

The fixing means for holding the hole or holes in correspondence with the respective reactor tube or tubes can in principle be chosen to be individual to each hole or common to the entire device. There are many more or less simple possibilities to effect this means. Of course, the simpler the fixing means the easier the operation will be and for that reason *screws and bolts are not preferred. Suitably, the fixing means is an insert extending from the edge of the hole into the top of the reactor tube ....*

'660 Patent col.3 ll.28-36 (emphasis added). It is on this language that both Tubemaster and Cat Tech base their proposed constructions. However, the Court is not persuaded by either party's interpretation of this language.

First, Cat Tech's proposed construction that limits the fixing means to inserts "extending from the edge of the hole into the top of the reactor tube" must be rejected because it seeks to limit the claim to a single preferred embodiment. *See Phillips,* 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments."). The specification indicates only that an insert "[s]uitably" has these characteristics, not that it *must* have these characteristics. Thus, the Court cannot limit the claim to this preferred embodiment.

However, the Court also cannot adopt Tubemaster's proposed construction that includes nuts and bolts. A court must base its construction of a means-plus-function claim on the description of the structure contained in the specification. The specification of this patent explicitly states that nuts and bolts are *not* preferred "means for holding." It would be strange indeed to construe a claim so as specifically to endorse embodiments that are explicitly *not* preferred, and this Court will not do so today.

The Court therefore arrives at its construction of the disputed claim term "means for holding" by deleting the objectionable components from each party's proposed construction. The result is "an insert, such as a spike, a pipe, a half-pipe or equivalent structure, that is either individual to each hole or common to the entire device, for holding the aperture in correspondence with the corresponding reactor tube." This is an appropriate construction because a person of ordinary skill in the art who read the specification would understand there to be some flexibility regarding the exact composition of the structure. This construction reflects that flexibility by identifying the general nature of the structure ("an insert"), providing illustrative examples taken from the specification ("such as a spike, a pipe, a half-pipe"), and then acknowledging that other such similar devices would also be covered ("or equivalent structure"). This construction avoids importing any unnecessary limitations into the claim. It also avoids specifically including non-preferred embodiments, yet does not specifically exclude them either. Thus, the Court adopts its own construction of "means for holding."

5. "Fixing means"

This disputed claim term is nearly identical to the previous one. Cat Tech and Tubemaster agree that "fixing means" is also a means-plus-function term that requires construction by the Court, and they agree on the

proper construction of the function, which is "aligning the aperture with the corresponding reactor tube." However, the parties are again in conflict over what form the structure can take. Tubemaster maintains once again that the "fixing means" can be either "a screw, a bolt, or an insert," while Cat Tech again argues that it *must* be insert, and that the insert *must* "extend[ ] from the edge of the aperture and [be] insertable into the top of the reactor tube to be loaded."

For the reasons discussed above, the Court rejects both proposed constructions and adopts its own. "Fixing means" is construed as "an insert, such as a spike, a pipe, a half-pipe or equivalent structure, that is either individual to each hole or common to the entire device, for aligning the aperture with the corresponding reactor tube."

C. Undisputed Terms

There are five additional claim terms that are no longer in dispute because Cat Tech and Tubemaster have agreed upon an appropriate construction. Thus, at the request of the parties, the Court hereby construes these claim terms in accordance with the parties' agreed constructions:

-> The Court construes the agreed claim term "plurality" to mean "more than one."

-> The Court construes the agreed claim term "aperture" to mean "an opening, such as a hole, gap or slit."

-> The Court construes the agreed claim term "plates" to mean "relatively flat."

-> The Court construes the agreed claim term "substantially cover" to mean "cover to a fairly large degree."

-> The Court construes the agreed claim term "particle" to mean "whole piece of catalyst or other solid body to be loaded."

III. CONCLUSION

The Court hereby adopts the following constructions of disputed claim terms:

Term	**Construction**
"spacing"	"gap"
"on top of"	"above"
"means for holding [the aperture in correspondence with the corresponding tube]"	"an insert, such as a spike, a pipe, a half-pipe or equivalent structure, that is either individual to each hole or common to the entire device, for holding the aperture in correspondence with the corresponding reactor tube"
"fixing means"	"an insert, such as a spike, a pipe, a half-pipe or equivalent structure, that is either individual to each hole or common to the entire device, for aligning the aperture with the corresponding reactor tube"

The Court declines to construe the disputed claim term "a width not greater than the smallest dimension of a single particle to be loaded" because this term has an ordinary and customary meaning that is widely accepted and will be readily understood by the jury.

The Court hereby adopts the following constructions of the undisputed terms:

Term	**Construction**
"plurality"	"more than one"
"aperture"	"an opening, such as a hole, gap or slit"
"plates"	"relatively flat"

"substantially cover"	"cover to a fairly large degree"
"particle"	"whole piece of catalyst or other solid body to be loaded"

IT IS SO ORDERED.

S.D.Tex.,2006.
Cat Tech Inc. v. Tubemaster, Inc.