United States District Court,
N.D. California.

LAM RESEARCH CORP,
Plaintiff.
v.
SCHUNK SEMICONDUCTOR and Xycarb Ceramics, Inc,
Defendant.

No. C 03-1335 CRB

Aug. 8, 2003.

Beth L. Mitchell, Glenn Edward Westreich, Esq., Patrick T. Michael, Esq., Nixon Peabody LLP, San Francisco, CA, for Plaintiff.

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CLAIM CONSTRUCTION

CHARLES R. BREYER**, District Judge.**

This suit involves the alleged infringement of United States Patent Number 5,074,456 ("the '456 patent"), a patent relating to electrodes used to manufacture semiconductors. Now before the Court is the task of claim construction. At issue is the meaning of the term "bonded" as used in claim 18.

BACKGROUND

I. Technology

The construction of semiconductors involves a process called "etching," in which unnecessary material is removed from the wafer surface. One method of etching uses a "parallel plate plasma reactor." Such a device places the wafer between two electrodes, then emits some type of gas through the top electrode. Radio frequency ("rf") energy is applied across the two electrodes, causing the gas to turn into plasma, which then burns the unnecessary material from the wafer.

There are many desirable properties for the material used in the construction of the upper electrode. These include electrical conductivity to transmit the rf energy, ability to withstand exposure to the plasma, non-reactivity with the plasma, ability to be maintained at a uniform temperature, machinability to form the passages necessary to deliver the gas uniformly, and low cost. '456 Patent at 1:49-2:7. No one material has been found with all of the desired properties. *Id*. at 16-17.

II. The '456 Patent

Prior to the '456 patent, electrodes were generally formed from a single material. Id. at 2:8-2:19. The idea of the '456 patent is to construct a composite electrode out of more than one type of material. The part of the electrode that is exposed to the plasma is a disk-shaped plate of uniform thickness constructed out of material which can be chosen mainly for its nonreactivity with the plasma. Id. at 2:29-3:19. The plate is then "bonded" to a support frame (usually in the shape of a ring) composed of an easily-machinable material which has the desired electrical, thermal, and structural properties. Id.

The dispute in this case involves claim 18, which discloses, in its entirety:

An electrode assembly comprising:

an electrode composed of a substantially pure material and having a substantially uniform thickness; and

a support ring **bonded** about the periphery of one face of the disk, leaving the other face substantially flat and free from protuberances, wherein the support ring is composed of an electrically and thermally conductive material

(emphasis added to the disputed term).

III. History of this Dispute

Plaintiff Lam Research Corporation ("Lam") is a designer and manufacturer of semiconductor processing equipment. It owns the '456 patent, and manufactures electrodes of the type described therein (the "Lam Electrode").

Defendant Xycarb Ceramics, Inc. is a manufacturer of semiconductor parts and is a subsidiary of defendant Schunk Semiconductor Group (the defendants are hereafter collectively referred to as "Xycarb"). Among Xycarb's products is a type of electrode (the "Xycarb Electrode") that competes with the Lam Electrode. Although Xycarb was aware of the '456 patent during its development of the Xycarb Electrode, Xycarb believed that new integration technology in the Xycarb Electrode differed from bonding technologies patented by Lam. Defs' Brief at 2, ll. 23-26.

International Business Machines Corp. ("IBM") was a customer for Lam Electrodes. According to Lam, on June 17, 2003, IBM informed Lam that it intended to stop ordering Lam Electrodes and instead use Xycarb Electrodes. Lam's TRO Application at 1, ll. 8-11. Claiming that the Xycarb Electrodes infringed on the '456 patent, Lam quickly filed for a temporary restraining order to prohibit the sale of Xycarb Electrodes to any customer.

The parties agreed that the resolution of their dispute was highly dependent upon the construction of the term "bonded" as it appears in the '456 patent. Expedited claim construction for this one term was scheduled.

IV. The Xycarb Electrode

Xycarb maintains that the Xycarb Electrode's design is not disclosed by the ' 456 patent because the Xycarb Electrode attaches the support ring to the electrode plate by means of a "shrink fit." A "shrink fit" is "a tight interference fit between mating parts made by shrinking-on, that is, by heating the outer member to expand

the bore for easy assembly and then cooling so that the outer member contracts." Defs.' Ex. F at 14 (McGraw Hill Dictionary of Scientific and Technical Terms).

The Xycarb Electrode supplements its shrink-fitting by filling the area with another material that Xycarb claims enhances conductivity but has no adhesive qualities. Defs.' Opp. to TRO, at 6.

DISCUSSION

The parties agree that the main issue before the Court at this point is whether or not "bonded" as used in claim 18 includes the shrink fitting technology used by Xycarb.

I. Legal Standard

Patent infringement analysis involves two steps. The first step is to construe the asserted claims and the second step is to determine whether the accused method or product infringes any of the claims as properly construed. *See* 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, construction of the patent claims, is a matter of law and thus the responsibility of the court. *See id*. at 979.

"In interpreting an asserted claim, the court should look first to the intrinsic evidence of record, i.e., the patent itself, including the claims, the specification and, if in evidence, the prosecution history." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). In examining the intrinsic evidence, the court should first look to the words of the claims themselves to define the scope of the patented invention. *See id*. Words in a claim "are generally given their ordinary and customary meaning." *Id*.

Second, the court should review the patent specification "to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning." *Id*. "The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." *Id*. The Federal Circuit teaches that "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*. Drawings included in the patent application have the same effect on claim language as other portions of the specifications. *See* Autogiro Co. of America v. United States, 384 F.2d 391, 398 (Ct.Cl.1967).

The third type of intrinsic evidence that the Court may consider is the prosecution history of the patent, if it is in evidence. *See* Vitronics, 90 F.3d at 1582. The prosecution history contains the entire record of the prosecution of the patent claim before the patent office, including any representations about the scope of the claim or the meaning of certain terms made by the applicant.

Ordinarily, the intrinsic evidence alone will resolve any ambiguity in a disputed term. By relying first on the claim language, the specification, and the prosecution history, a court can protect a patentee's rights while at the same time enabling the public to rely on the public record of the patentee's claim. "In other words, competitors are entitled to review the public record, apply the established rules of claim construction, ascertain the scope of the patentee's claimed invention and, thus, design around the claimed invention." Vitronics, 90 F.3d at 1583 (citing Markman, 52 F.3d at 978-79). For these reasons, "[o]nly if there [is] still some genuine ambiguity in the claims, after consideration of all available intrinsic evidence, should the trial court [ ] resort[ ] to extrinsic evidence." *Id*. at 1584; *see* Key Pharmaceuticals v. Hercon Labs Corp., 161 F.3d 709, 716 (Fed.Cir.1998) (noting that extrinsic evidence is appropriate if the intrinsic evidence "does not answer the question").

II. Analysis

A. Proposed Constructions

Lam suggests:

"Bonded means that there is (1) a connection between the electrode plate and support ring that has the strength necessary to hold these parts together in use, and that is capable of achieving the necessary (2) electrical conductivity and (3) thermal conductivity."

Xycarb suggests:

"Bonded means that there is a metallurgical, chemical, or adhesive connection of the support ring upon the periphery of one face of the electrode disk which has the strength necessary to hold these parts together in use, and that is capable of achieving electrical and thermal conductivity necessary to operate the upper electrode in use."

These constructions are substantially the same, except that (1) Xycarb states that the connections must be "upon the periphery of one face of the electrode disk" and (2) Xycarb restricts the possible connections to "metallurgical, chemical, or adhesive."

B. "upon the periphery of one face of the disk"

This language is extraneous. In the context of claim 18, "bonded" is immediately followed by "about the periphery of one face of the disk, leaving the other face substantially flat and free from protuberances." If Xycarb's construction language is identical-that is, " *upon the periphery* " has the same meaning as " *about the periphery* "-then it is redundant. If it is not identical, then the construction is not supported by any of the intrinsic or extrinsic evidence Xycarb has identified. Either way, it would be erroneous to include this language in the construction of the term "bonded."

C. "metallurgical, chemical, or adhesive connection"

Xycarb similarly points to no intrinsic or extrinsic evidence to support its limitation of bonding to a "metallurgical, chemical, or adhesive connection." At oral argument, Xycarb admitted that its construction simply generalizes from various examples of bonding mechanisms in the specification. Without any evidentiary support, the Court cannot accept Xycarb's generalizations as valid limitations.

D. Does bonding include shrink-fitting?

Despite the Court's rejection of Xycarb's construction language, the main issue-whether "bonded" includes components attached via a shrink fit-remains.

Lam argues that the specification settles this issue when it states that "[t]he support ring may be bonded to the electrode plate *by any suitable process* which provides the necessary bonding strength as well as thermal and electrical characteristics." '456 Patent at 5:64-67 (emphasis added). The Court, however, finds this specification language unhelpful in illuminating any inherent limitations on the term "bonded," such as whether it includes shrink fitting. If one were to state that "swimming may be performed by any suitable

process that provides transportation across a body of water," this would provide no evidence as to whether riding a boat across the San Francisco Bay is a form of swimming.

Instead, the Court finds dispositive the intrinsic evidence provided by other claims of the '456 patent. In particular, Lam's own interpretations of claims 32 and 33 reveal that "bonded" does *not* include parts that have been shrink fitted.

1. Claim 32

Claim 32 discloses "an electrode assembly as in claim 18, wherein the support ring is pre-stressed to impart a radially inward compression on the electrode disk." Lam argues that this claim "describes the very essence of a 'shrink-fit' " and "expressly discloses what any mechanical engineer would understand to be a 'shrink fit'." Pls.' Brief at 7-8.

The Court agrees that the pre-stressing referenced in claim 32 "describes the very essence of a 'shrink-fit'," but does not agree with Lam's assertion that the claim "specifically discloses a 'shrink fit' *as a suitable method of bonding* the electrode plate and support ring.' " Id. at 8, ll. 3-4 (emphasis added.) Claim 32's reference back to claim 18, which explicitly requires bonding, shows that the pre-stressing described in claim 32 is, in fact, a separate step to be performed in addition to bonding.

The separateness of the two processes is made clear by contrasting the language of claim 32 with the language of claim 24. Claim 24, which is also dependent on claim 18, discloses in its entirety "[a]n electrode assembly as in claim 18, *wherein the disk is bonded to the ring by means of* a bonding layer." (emphasis added). The language of claim 24 makes clear that "a bonding layer" is a "means of" bonding. The language of claim 32 does not refer to pre-stressing as a "means of" bonding, suggesting that pre-stressing is something entirely different.

This difference is further elucidated by the specification's discussion of pre-stressing: "In forming the electrode assembly 10, it will be desirable to 'pre-stress' the support ring so that it provides a radially-directed inward compression on the electrode plate 12. Such compressive stress helps to inhibit stress fracturing of the electrode plate during use. More specifically ... the support ring will apply a constant compressive force on both the electrode plate *and the bonding layer*." '456 Patent at 6:62-7:6 (emphasis added). Since "the bonding layer" is affected by the pre-stressing, bonding must have already occurred prior to compression.

At the Markman hearing, Lam argued that since dependent claim 32 describes a stress fit, claim differentiation requires the Court to construe "bonded" in claim 18 as including, but not limited to, a stress fit. FN1 Lam's argument, however, presupposes that the shrink fitting methodology disclosed in claim 32 is a type of bonding. As the Court has shown, the shrink fitting in claim 32 is instead an additional step beyond bonding. The Court's construction satisfies the principles of claim differentiation: claim 18 does not require the additional shrink fitting step described in claim 32.

FN1. Claim differentiation "prevents the narrowing of broad claims by reading into them the limitations of narrower claims." Clearstream Wastewater Sys., Inc. v. Hydro-Action, Inc., 206 F.3d 1440, 1446 (Fed.Cir.2000).

2. Claim 33

Claim 32 is not the only claim that Lam interprets as describing a shrink fit. Lam also contends that claim 33 "specifically discloses a 'shrink fit' as a method for bonding." Pls.' Brief at 8 n.4. As with claim 32, the Court agrees that shrink fitting is disclosed, but finds that the shrink fitting is an additional step beyond bonding.

Claim 33 teaches, in its entirety:

a method for forming an electrode assembly including a support ring and an electrode plate, said method comprising:

bonding the support ring about the periphery of the electrode plate at elevated temperature, wherein the material of the electrode plate has a higher coefficient of thermal expansion than that of the electrode plate [sic]; and

allowing *the bonded assembly* to return to room temperature, whereby the differential contraction imparts the desired stress.

(emphasis added).

This claim is confusingly worded. It is unclear how the coefficient of thermal expansion of the electrode plate's material can be greater than that of the electrode plate itself. What is clear, however, is that the claim describes some form of thermally-induced compression. The Court is therefore inclined to agree with Lam that it discloses, or is at least suggestive of, shrink fitting.

However, the temperature change described in claim 33 is not the methodology by which a "bonding" is achieved; instead, it defines the conditions under which a "bonding" is performed. The claim describes "bonding" as taking place at an elevated temperature and refers to the cooling assembly as already being "bonded." The specification elaborates when it discusses "utilizing a support ring which is formed from a material which has a slightly larger thermal expansion coefficient than that of the electrode plate, and *forming or curing the bonding layer* at a temperature above the expected operating temperature." ' 456 Patent at 6:67-7:4 (emphasis added). Since the bonding layer is formed at the elevated temperature, the temperature change does not itself form the bond.

3. Conclusion

Claims 32 and 33 both discuss thermally-induced compression similar or identical to shrink fitting, but discuss it in the context of processes to be performed in addition to bonding. This shows that the inventors of the '456 patent were aware of the "very essence of a shrink fit" but did not consider it to be a form of bonding. It would make no sense to shrink fit to bond the components and then thermally compress them again under the teachings of claims 32 and/or 33.

Therefore, the Court finds that "bonded" as used in claim 18 does not include components attached via a shrink fit.

CONCLUSION

For the foregoing reasons, the Court construes "bonded" to mean "there is a connection between the electrode plate and support ring that has the strength necessary to hold these parts together in use, which (1) was not created by a shrink fit and is maintained by some force other than compression, (2) is capable of achieving the necessary electrical conductivity, and (3) is capable of achieving the necessary thermal conductivity."

IT IS SO ORDERED.

N.D.Cal.,2003.
Lam Research Corp. v. Schunk Semiconductor