United States District Court,
N.D. California.

QUANTUM CORPORATION, a Delaware Corporation,
Plaintiff.
v.
STORAGE TECHNOLOGY CORPORATION, a Delaware Corporation,
Defendant.

No. C 03-01588 WHA

Feb. 17, 2004.

Christopher L. Kelley, Matthew E. Hocker, Howrey Simon Arnold & White LLP, Menlo Park, CA, John Lynch, Howrey Simon Arnold & White LLP, Houston, TX, for Plaintiff.

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CLAIM CONSTRUCTION RULING

WILLIAM ALSUP**, District Judge.**

INTRODUCTION

There are two patents-at-issue in this action, United States Patents 5,474,253 and 4,809,110. Two terms are disputed in each of the patents. This is the final claim construction of the terms "changes gradiently" and "generally opposite" from the '253 patent and the terms "generally arcuate outer surface which the tape passes adjacent thereto" and "natural radius of curvature of the tape" from the '110 patent.

STATEMENT

Quantum Corporation filed this patent-infringement action against Storage Technology Corporation ("StorageTek") on April 14, 2003. Quantum alleged that StorageTek infringed and continually infringes the '253 and '110 patents. Tutorial and claim-construction hearings were held respectively on February 4 and February 11, 2004. A brief summary of the technology and the inventions involved follows.

1. THE '253 PATENT.

Entitled "Wedged Reels in Streaming Tape Drivers and Tape Cartridges," the ' 253 patent relates to a reel for spooling magnetic tape used for data storage in computer systems. The reel consists of a hub upon which the tape is wound and two flanges which protect the tape edges and assist in stacking the tape around the

hub. The reel is used in a system akin to one for music cassettes where one reel supplies the tape to be passed across the head in a tape drive that reads the data on the tape and a second reel takes up the tape. As the tape moves between the supply and take-up reels during operation, it is guided over the tape head in a precise manner as to allow accurate reading or writing. The tape heads can read or write. For simplicity, this order uses the read head as illustrative of both types.

Unlike the magnetic tape in a music cassette, the magnetic tape for data storage in computer systems contains much larger amounts of data. It contains around 160 gigabytes of uncompressed data, which is equivalent to the amount that can be stored on 110,000 diskettes. The data are also read at higher speeds. Thus, the magnetic tape crosses near the tape heads at much higher speeds. The tape speed of a music cassette is about three inches per second while the tape speed relevant to the patents-at-issue is known to approximate 110 inches per second.

Parallel tracks are placed on the magnetic tape to allow greater storage of data; greater the number of tracks, more information can be stored. The tape heads also read multiple tracks at a time for an increase in operating ability. With increasing number of tracks, however, the space between the tracks decreases. Accordingly, the track on the tape has to be aligned with the tape head more precisely to insure that the desired track is accurately read. Put differently, reading highly-dense magnetic tapes requires even greater precision in placing the tape exactly over the read head.

In the prior art, a reel consisted of two parallel flanges mounted on each side of a hub. The distance between the flanges was slightly greater than the width of the tape. The prior art encountered two main problems. *First,* as the tape wound onto the reel, it tended to stack in an uneven manner. The uneven stacking caused an undesirable wobble, *i.e.* lateral tape motion, over the read heads as the tape was supplied off the reel. The lateral tape motion caused reading errors because it prevented the tape from staying in a constant position over the tape head. *Second,* the tape was damaged when the space between the two flanges was reduced in an attempt to force the tape to stack more evenly.

The object of the '253 patent is to solve both problems in the prior art. The invention is a wedged reel having flanges that diverged from one another in varying degrees such that the flanges were separated from one another at different distances at any given point. The location of the minimum separation between the flanges is generally opposite the location of the maximum separation. This is best illustrated by Figure 4 in the '253 patent, reproduced here.

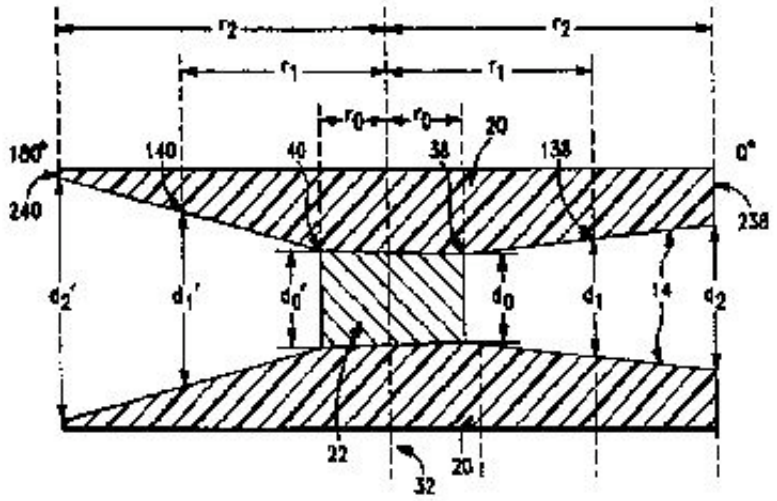

FIG. 4

This change in flange design forces more uniform stacking of the tape because once during every revolution of the reel the edge of the tape will tap against a flange at the region of minimum separation between the flanges. The change also reduces the wear on tape edges because one side of the wedged reel has wider separation between the flanges.

2. THE '110 PATENT

While the '253 patent addresses the reel, the '110 patent addresses the head assembly. Entitled "Narrow Contoured Head Assembly," the '110 patent relates to a read/write head structure for a digital magnetic-recording device. As in all digital magnetic-recording devices, successful reading of the magnetic tape requires the tape to move across the head in close and consistent proximity. Too small a distance or too great a pressure causes physical damage to the magnetic tape or the head or the recording of phantom signals. Too great a distance decreases exponentially the read head's ability to accurately read the data.

In the prior art of wide island heads, the head assembly consisted of a core (with an air gap) made of highly permeable material with an electrical coil wound around the base of the core and the core was embedded in and flush with the surfaces of hard, highly polished sliders. With use, the entire head wore down quickly as the tape raced across, with the softer core wearing out more quickly than the harder sliders. As the core wore down, the distance between the tape and core increased so that the signals lost resolution and the noise on the tape increased. Eventually, the cores needed to be replaced. The wide island heads also were susceptible to errors caused by contaminants on the tape.

The '110 patent purports to provide a self-cleaning head assembly that wears down slower and reduces the number of errors from contaminants on the tape. The '110 patent provides that wear can be reduced if the top contour of the read/write head more closely matches the "natural radius of curvature of the tape." Moreover, the read/write head is raised on minuscule islands, rather than embedded flush with the sliders as in the prior art, in order to create a smaller surface area that can be affected by contaminants on the tape.

ANALYSIS

1. THE '253 PATENT: "CHANGES GRADIENTLY."

The '253 patent does not expressly define "changes gradiently." Throughout the patent, however, the term is intimately associated with the separation between the flanges as that distance changes around the axis of rotation. For example in independent Claim 1, the pertinent language states (Col.6:1-3, 10-12):

two flanges, the flanges being located on opposite sides of the hub and being in spaced apart relationship along the axis of rotation ...

the separation between the facing surfaces further changes gradiently along a circular path centered on the axis of rotation....

Quantum proposes that "changes gradiently" means "generally changes between a minimum and a maximum as one travels around an imaginary clock face defined by the reel" (Br.6). Meanwhile StorageTek contends "changes gradiently" means "changes linearly" (Opp.2).

This disputed terms should be given its ordinary meaning. Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202-04 (Fed.Cir.2002), *cert. denied,* 538 U.S. 1058, 123 S.Ct. 2230, 155 L.Ed.2d 1108 (2003). In this respect, this order finds helpful the definition of gradient as "the inclination or the rate of regular or graded ascent or descent." *See* Webster's Third New International Dictionary 985 (1993). Thus, this order holds that "changes gradiently" requires some change in the rate of ascent or descent. By this definition, the only change that is excluded is no change, *i.e.,* a flat line. The change could be linear or curvilinear. This order adopts the dictionary meaning above.

The specification and prosecution history do not compel a different meaning. The specification explains increasing gradiently as (Col.4:12-19):

The distance between facing surfaces **14** increases gradiently as one travels along the circumferential path ...

that is, distance between the flange surfaces varies from a minimum d_1 at location **138** to a maximum d_1' at location **140** which is 180 away from location

In another paragraph in the specification, "gradient" is similarly described as an increase in flange separation along a 180 (deg.) rotation (Col.4:57-59). Thus, the specification considers gradient change as some variance between minimum and maximum.

StorageTek contends that the specification defines "changes gradiently" as "changes linearly" because the two phrases are used interchangeably. As admitted by StorageTek at the claim construction hearing, however, the specification uses these terms to describe the preferred embodiment illustrated in Figure 6 and the phrase "changes linearly" is used only one time. In comparison to this one time usage to describe the change in separation, the specification uses the term "gradient" two times and four times the phrase "increas[ing] from a minimum to maximum" along a 180 (deg.) rotation (Col. 2:36-38; *see also* Cols. 2: 31-35, 3:61-63, 5:8-10). Accordingly, this order holds that the phrase "changes linearly" may be used interchangeably to describe the preferred embodiment in Figure 6 but does not suggest a clear intention of the inventor to limit the claim term to the special case of a straight line. *See* E-Pass Techs., Inc. v, 3COM Corp., 343 F.3d 1364, 1369 (Fed.Cir.2003). Rather, the specification gives different examples of how the

change in separation can vary as the reel turns. No single example in the specification should limit the claims. *See* Prima Tek II, L.L.C. v. Polypap, S.A.R.L., 318 F.3d 1143, 1152 (Fed.Cir.2003).

The prosecution history also supports a broader construction. The examiner rejected the phrase "further increasing from a minimum to a maximum" because the phrase did not accurately reflect the change in spacing between the flanges when the reel turned so that the separation proceeded from maximum to minimum (Dowler Decl. Exh. E, at 2-3). In response, the pending '253 patent claims were amended to include the term "changing gradiently" to replace the rejected phrase "further increasing from a minimum to a maximum" (Dowler Decl. Exh. F, at 3). This change was accepted by the examiner.

StorageTek contends that this exchange with the PTO somehow evinces an intent to narrow the claim to linear changes only. The linear case would rule out any curvilinear gradient other than straight lines. Nowhere in the prosecution history did the applicant clearly manifest an intent to restrict or narrow the claim scope such that there is a clear disavowal. Teleflex, Inc. v. Ficosa, 299 F.3d 1313, 1326 (Fed.Cir.2002). The exchange with the PTO shows that applicant amended the claim to include the term "gradiently" to accurately reflect change from minimum to maximum and vice versa, and not to narrow the claim scope. The '253 applicant did not surrender all other variations that are not linear changes in the prosecution history. Accordingly, this order holds that "changes gradiently" is construed as any change in the rate of ascent or descent, which encompass all change except a flat line.

2. THE '253 PATENT: "GENERALLY OPPOSITE."

Claims 1, 6, and 8 of the '253 patent require the "location of minimum separation" to be "generally opposite of the location of maximum separation." The parties dispute as to the amount of deviation that the word "generally" would allow from opposite. If the point of minimum separation is located at 0 (deg.), then the parties agree that exact opposite would be 180 (deg.) (*See* Br. 11, Opp. 6). The parties also agree that the word "generally" allows some deviation from exactly opposite.

This order finds that this phrase need no further elaboration. Instead, this order finds that the plain and ordinary meaning of "generally opposite" is readily comprehensible to the jury. The parties even agree to the plain and ordinary meaning of some amount of deviation from exact opposite. How much deviation is allowed will depend on the fact and circumstances which the jury could readily and reasonably determine based on the plain and ordinary meaning of the phrase.

3. THE '110 PATENT: "A GENERALLY ARCUATE OUTER SURFACE WHICH THE TAPE PASSES ADJACENT THERETO."

The '110 patent does not expressly define "a generally arcuate outer surface which the tape passes adjacent thereto" (Col.6:4-6). The parties agree to the plain and ordinary meaning of the following words: "generally" as determined above and "arcuate" as arced (*see* Joint Claim Construction Statement 5-6). The axis of contention revolves around what constitutes "outer surface."

Since the parties agree to the meaning of "arcuate" as arced, this order finds that the disputed phrase should be given its plain and ordinary meaning. Accordingly, the phrase is construed to mean a generally arced outer surface near which the tape passes. With the substitution of "arced" to clarify "arcuate," the plain and ordinary meaning of this phrase is readily discernible to the jury and needs no further construction. *See* Sulzer Textil A.G. v. Picanol N.V., 358 F.3d 1356, 2004 WL 291566 (Fed.Cir. Feb.17, 2004) ("The *Markman* decisions, in ruling that claim construction is a matter of law for the court, do not hold that the

trial judge in a patent case must repeat or restate every claim term in the court's jury instructions. The district court simply must give the jury guidance that 'can be understood and given effect by the jury once it resolves the issues of fact which are in dispute.' ") (internal citations omitted).

4. THE '110 PATENT: "NATURAL RADIUS OF CURVATURE OF THE TAPE."

The parties agree the disputed phrase "natural radius of curvature of the tape" is defined by a formula in the specification of the '110 patent. They dispute as to what the exact formula should be because the formula in the printed patent ($(theta)_W R_n$ =2N/T) is incorrect. In the original typewritten application, the formula read $(theta)_W R_n$ =2 sqrt(2N/T After the lawsuit was filed, Quantum received a certificate of correction to correct the formula.

At the outset, this order notes that the certificate of correction cannot be considered in this claim construction. "The certificate of correction is only effective for causes of action arising after it was issued." Southwest Software, Inc. v. Harlequin Inc., 226 F.3d 1280, 1294 (Fed.Cir.2000).

Quantum argues, however, that the goof can be retroactively fixed through claim construction. Quantum contends that the intrinsic evidence compels a correction. While the patent claims do not expressly define the disputed phrase, the disputed phrase was expressly defined in the printed specification. The printed specification expressly stated (Col.4:39-46):

It is a feature of my invention that the final radius of curvature of the head, its running radius, approximates the "natural curvature" of the tape. This "natural curvature," which is the radius of the smallest circle the tape can form without breaking, is determined by the inherent stiffness of the tape N, the tension T, applied to it, and the wrap angle $(theta)_w$ in accordance with the formula $(theta)_w R_n$=2N/T.

The inventor is his own lexicographer and he may use the specification to supply implicitly or explicitly new meaning for terms. *See* Electro Scientific Indus. v. Dynamic Details, Inc., 307 F.3d 1343, 1347 (Fed.Cir.2002). On the face of the printed patent, the inventor defined the disputed phrase according to formula $(theta)_w R_n$=2N/T.

Quantum admits that the formula is not in any standardized textbooks but is one created by the inventor of the '110 patent. Thus, the formula has no ordinary meaning to one skilled in the art. Consequently, even if the prosecution history contained the square root sign, a person ordinarily skilled in the art would not know which formula was correct. The patent issued is given the presumption that it is valid and correct. Moreover, when the potential error is not evident on its face, it is reasonable for an ordinary person skilled in the art to assume the latter language in an issued patent is the correct language. This order holds that the natural radius of curvature of the tape is defined by the formula $(theta)_w R_n$=2N/T, precisely as stated in the printed patent itself.

Quantum argues that one skilled in the art would know that the formula was incorrect because the unit dimensions are not consistent on both sides of the equation if one factors them through. To be sure, some engineers might check into the units represented on both sides of the equation to check consistency. But others would not. Even if they did, one would only know the formula was inconsistent. One would still not be sure what was intended, only what was not intended. Thus, this order rejects Quantum's contention that the incorrect formula is a minor error that can be corrected by the Court. The Federal Circuit held that "[a] district court can correct a patent only if (1) the correction is *not* subject to reasonable debate based on

consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims." Novo Indus. L.P. v. Micro Molds Corp., 350 F.3d 1348, 1357 (Fed.Cir.2003) (emphasis added). FN1

CONCLUSION

The foregoing claim-construction ruling shall govern all subsequent proceedings herein.

IT IS SO ORDERED.

FN1. With its opposition, StorageTek submitted the declaration of Richard Dee, a StorageTek employee who has had the responsibility for designing tape head assemblies since 1982 (Dee Decl. para. 1). He declared that he had never heard of the phrase "natural radius of curvature of tape" and had never seen the formula in the '110 patent (Dee Decl. para.para. 5-6, 8-9). Quantum requests this declaration be stricken because StorageTek failed to identify Mr. Dee for claim construction in their joint claim construction statement. Accordingly, Quantum did not have an opportunity to depose witnesses in the time allotted under Patent Local Rule 4-4. This order need not rely upon the declaration, therefore, the request is **DENIED** as moot.

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