

United States District Court,
D. New Hampshire.

MARKEM CORP,
v.
ZIPHER LTD. and.

No. 07-cv-0006-PB

Aug. 28, 2008.

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MEMORANDUM AND ORDER

PAUL BARBADORO, District Judge.

Markem Corporation ("Markem"), a manufacturer of thermal transfer printers, seeks a declaratory judgment that neither Markem nor its printers have infringed a patent held by Zipher Ltd. ("Zipher"). In this Memorandum and Order, I construe the relevant patent terms.

I. BACKGROUND

A. Overview of Thermal Transfer Printers

This dispute involves the tape drive systems used in industrial thermal transfer printers. Product manufacturers use these printers to rapidly print unique information onto individual labels or packaging material. For example, a potato chip manufacturer might use a thermal transfer printer to stamp expiration dates onto a roll of flat potato chip packages before separating the roll into individual bags and filling the bags with potato chips.

The act of thermal transfer printing consists of pressing a print head against an inked tape that contacts the printing medium (the potato chip bag) and then using the print head to selectively heat the tape, thereby transferring the desired ink pattern to the printing medium (e.g., "BEST IF USED BY 08.29.2008"). The basic principle is similar to that of a typewriter or dot matrix printer, except that the print head uses heat rather than the force of the impact to transfer the ink from the ribbon to the printing medium.

The printer may be required to operate in intermittent mode or continuous mode, depending on how the

production line is set up in a particular factory. In intermittent mode, the printing medium is advanced into position and remains stationary during the printing process. In continuous mode, the printing medium advances through the printer at a constant rate throughout the printing process; as the printing medium moves forward, the printing head moves with it. Once the current sheet has been printed, the printing head then rapidly returns to its home position and the printing ribbon briefly rewinds so that the printing head is lined up with the boundary between the used and unused sections of ribbon.

As with any industrial application, reliability is extremely important in a thermal transfer printer. Some of the failures that can interrupt the operation of such a printer include excessive tape tension (which can cause the tape to break, forcing the operator to halt the production line to respool the tape), insufficient tape tension (which can interfere with the printer's ability to position the tape properly), wastage of unused tape (which forces the operator to replace the tape spools more frequently), and mechanical failures caused by wear and tear on the tape drive system. Accordingly, tape drives must be designed to maintain tape tension within an appropriate range.

For two reasons, simply rotating each spool the same number of degrees for each printing cycle will not produce consistent tape tension. First, even in perfect conditions, rotating a given spool by a given number of degrees will result in a different length of ribbon advance depending on the diameter of ribbon on the spool. For example, a one-degree rotation of a spool 100 mm in diameter will result in about 0.9 mm of ribbon advance, whereas a one-degree rotation of a spool 50 mm in diameter will result in only about 0.4 mm of ribbon advance. Thus, the rotation of each spool must be adjusted according to the amount of ribbon remaining on the spool. Second, real-world conditions can interfere with the ideal mathematical relationship between spool diameter, spool rotation, and ribbon advance. For example, ribbon may stretch unevenly over time, causing unpredicted slack to develop. Additionally, if the ribbon breaks, operators may take actions (such as taping two sections of ribbon together or tying off the ribbon) that make it even more difficult to measure how much ribbon remains on each spool.

B. Prior Art

The most common form of prior art relies upon a single motor to drive the take-up spool (the spool onto which used ribbon is taken up), with tension control provided by some form of "slipping clutch" arrangement on the supply spool (the spool from which fresh ribbon is drawn). As the take-up motor pulls more ribbon from the supply spool, the slipping clutch provides a resistive force that maintains an appropriate level of tension in the ribbon. The slipping clutch becomes less reliable, however, as it wears out over time. Additionally, a slipping clutch system's reliance on friction for tension control limits the acceleration, deceleration, and maximum speed capability of the ribbon transport system.

Other prior art uses two motors, with one motor driving the ribbon in a tape-transport direction and the other functioning solely for tension control, not ribbon advance. For example, U.S. Patent No. 5,366,303 (filed May 11, 1993) ("Barrus") discloses a printer that employs a take-up motor and a supply motor. Barrus, however, is a "pull-drag" device in that only the take-up motor provides rotational torque in the direction of ribbon transport; the supply motor merely provides a variable drag on the other motor.

C. The '572 Patent

The patent at issue in this case, U.S. Patent No. 7,150,572 (filed Dec. 19, 2006) ("the '572 Patent"), discloses a tape drive intended for use in a thermal transfer printer.

The exemplary embodiment described in the specification consists of two stepper motors FN1 operating in push-pull mode. The exemplary embodiment energizes FN2 both motors to drive the spools in a tape transport direction, drives the spools to add or subtract appropriate lengths of ribbon for tension control purposes, uses the operation of the motors to measure tape tension without making physical contact with the tape, and switches easily between continuous and intermittent operation.

FN1. The parties agree that a "stepper motor" is an electric motor that achieves step advance of a motor shaft.

FN2. The parties agree that "energization" is the application of electrical power to the motors, and that to "energize" means to cause electrical power to be applied to the motors.

At issue in this case is Claim 1, which reads as follows:

A tape drive comprising:

two motors, at least one of which is a stepper motor;

two tape spool supports on which spools of tape are mounted, each spool being driveable by a respective one of said motors;

a controller adapted to control energization of said two motors such that tape is transported in at least one direction between spools of tape mounted on the spool supports;

wherein the controller energizes both said motors to drive the spools in a tape transport direction, and

said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between predetermined limit values and controls said motors to drive the spools to add or subtract the calculated length of tape to or from the tape extending between said spools.

The claim chart in Appendix A identifies the terms construed in this order and the definitions proposed by each of the parties.FN3

FN3. The parties have proposed differing constructions of certain other terms in the claim. Because it appears unlikely that the differences between their respective constructions will affect the infringement analysis, I decline to construe them at this time. *See* O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1362 (Fed.Cir.2008) ("[D]istrict courts are not (and should not be) required to construe every limitation present in a patent's asserted claims.").

II. CLAIM CONSTRUCTION

The words of a patent claim "are generally given their ordinary and customary meaning." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). "[T]he 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, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed.Cir.2005).

To ascertain this meaning, I examine the so-called intrinsic evidence, including the claim language, the patent specification, and the prosecution history. *Id.* The claim language is a useful starting point. *Id.* "[T]he context in which a term is used in the asserted claim can be highly instructive." *Id.* at 1314. "Differences among claims can also be a useful guide in understanding the meaning of particular claim terms." *Id.* In addition, "claims 'must be read in view of the specification, of which they are a part.'" *Id.* at 1315 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995), *aff'd*, 517 U.S. 370 (1996)). In fact, the specification is usually "the single best guide to the meaning of a disputed term." *Id.* (quoting *Markman*, 52 F.3d at 979). Finally, the prosecution history should also be consulted to clarify "how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.* at 1317. Extrinsic evidence such as dictionaries, treatises, and expert testimony may also be useful if "considered in the context of the intrinsic evidence." *Id.* at 1319.

Although there is "no magic formula or catechism for conducting claim construction," *id.* at 1324, the Federal Circuit has made clear that "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed.Cir.1998)).

III. ANALYSIS

A. Construction of "Drive" and "Driveable"

The first claim terms that the parties have asked me to construe are the terms "drive" and "driveable." Markem urges me to adopt a narrow construction of both terms in which the motor "drives" the spool only when the motor is energized to rotate the spool—that is, when the motor applies torque to the spool that causes it to rotate. Zipher urges me to adopt a much broader construction in which the motor "drives" the spool whenever the motor controls the movement of the spool, regardless of whether the motor exercises that control by applying rotational torque or by applying a holding torque that prevents the spool from turning. The parties base their arguments on both intrinsic and extrinsic evidence. Because the intrinsic evidence (consisting of the claim itself, usage of "drive" and "driveable" within the specification, and patent prosecution history) clearly establishes the meaning of the disputed terms, I need not consider the extrinsic evidence, which in any event does not contradict my reading of the intrinsic evidence.FN4 *See Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1382 (Fed.Cir.2008) ("A court may look to extrinsic evidence so long as the extrinsic evidence does not contradict the meaning otherwise apparent from the intrinsic record").

FN4. Zipher relies on the *McGraw-Hill Dictionary of Scientific and Technical Terms*, which defines "drive" as the "means by which a machine is given motion or power ... or by which power is transferred from one part of a machine to another ..." *McGraw-Hill Dictionary of Scientific and Technical Terms* 616 (Sybil P. Parker ed., 5th ed.1994). At best, this dictionary definition establishes that the word "drive" may carry a range of different meanings depending on the context in which it is used. As discussed below, however, the specification and prosecution history show that Claim 1 of the '572 Patent uses the word "drive" in a single, relatively narrow context that constrains its meaning. Accordingly, the dictionary definition has no effect on my analysis.

1. Usage in the Claim

I first consider the claim language itself, for as a general rule, "a claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent." *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed.Cir.2001); *see also* *PODS, Inc. v. Porta Stor, Inc.*, 484 F.3d 1359, 1366 (Fed.Cir.2007), *cert. denied*, 128 S.Ct. 618 (U.S.2007). The terms "drive" and "driveable" are used in three elements of the claim. I address each in turn.

(a) First Usage

"[T]wo tape spool supports on which spools of tape are mounted, each spool being **driveable** by a respective one of said motors ..." ('572 Patent, col. 28, ll. 36-38)

This usage sheds no light on the meaning of "drive," because it could equally support either the broad or the narrow construction.

(b) Second Usage

"[T]he controller energizes both said motors to **drive** the spools in a tape transport direction ..." ('572 Patent, col. 28, ll. 43-44)

This usage more strongly supports Markem's narrower construction. When the motors "drive the spools in a tape transport direction," this can only mean that the motors are actively causing the spools to rotate. It would be nonsensical, for example, to say that the controller may energize the motors to hold the spools stationary "in a tape transport direction," because a spool cannot simultaneously rotate yet also remain motionless. For this reason, Zipher correctly concedes that, at least in the context of this particular usage, energizing the motors "to drive the spools in a tape transport direction" means to energize the motors "such that each motor turns its respective spool in a tape transport direction." (Opening Br. of Zipher and Videojet on Claim Construction 26.)

Adopting this common-sense construction creates a problem for Zipher, however, because it threatens to create an inconsistency between various instances of "drive" within the claim. *See Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1328 (Fed.Cir.2006) (holding that when the same term appears in different portions of a patent's claims, each instance should be given the same meaning as the others unless the specification and prosecution history make it clear that the term has different meanings at different portions of the claims); *Rexnord*, 274 F.3d at 1342 (stating the general rule that "a claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent"). During oral argument, Zipher argued that its construction of the second usage is nevertheless consistent because the term "control" is vague enough, depending on the circumstances, to encompass every controlled state of the spools, whether rotating or stationary. That is, "drive" sometimes means control that results in rotation and sometimes means control that prevents rotation. In support of this vague definition, Zipher analogizes the patent's use of "drive" to driving a car. The phrase "driving a car toward Boston," for example, may encompass not only controlled forward and reverse movement, but also controlled stops. It is accurate, for example, to describe me as "driving" my car both when I am accelerating onto a highway onramp and when I am idling in neutral at a stoplight.

Zipher's analogy fails, however, because it conflates the the *motor's* relationship to the spools with the *controller's* relationship to them. When I "drive" my car, I am not directly applying torque to the wheels.

Rather, I am using the gas pedal to send control signals to the engine. In response to these control signals, the engine applies torque to the car tires, causing them to accelerate or decelerate as desired. My role in "driving" the car is thus not analogous to a motor's role in "driving" the spools of a thermal printer. Rather, my role as a car driver is most akin to that of the controller to the print system as a whole (sending control signals to the printer motors, but not directly applying torque to the spools), and the relationship of the engine to the car tires is most closely akin to the relationship of the printer motors to the spools (directly applying torque to the spools). Zipher's analogy works only if I assume that the motor-spools relationship is more like the driver-car relationship than the engine-wheels relationship. It is not. FN5 Zipher's analogy therefore offers no assistance in construing "drive" and "driveable" as those words are used in Claim 1 of the '572 Patent.

FN5. For example, when I am idling my car in neutral at a stoplight, I am still "driving" the car, but the engine is not "driving" the wheels. The word "drive" has distinct meanings when applied to my relationship to the car and when applied to the engine's relationship to the wheels.

Without the aid of this flawed analogy, Zipher's construction would require me to give inconsistent constructions of "drive" in different sections of the claim. Such a result would be undesirable and should be avoided unless it is clear from the prosecution history and specification that "drive" should have different meanings in different parts of the claim. *See Wilson*, 442 F.3d at 1328; *Rexnord*, 274 F.3d at 1342. That is not the case here. The second usage therefore supports Markem's construction, which introduces no such inconsistencies.

(c) **Third Usage**

"[S]aid controller ... controls said motors to **drive** the spools to add or subtract the calculated length of tape to or from the tape extending between said spools." ('572 Patent, col. 28, ll. 45-51)

The third usage even more strongly supports the narrower interpretation of "drive." It is easy to understand this sentence under Markem's narrow construction: that is, the controller controls the motors to rotate the spools to add or subtract certain lengths of tape. Replacing "drive" with Zipher's broad construction, however, results in the following: the "controller ... controls said motors to *control* the spools to add or subtract the calculated length of tape." If the drafters of the '572 Patent had intended to give this meaning to the claim, then one would expect them to have simply repeated the word "control" multiple times rather than inserting "drive" as a synonym for "control." *See Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1119 (Fed.Cir.2004) ("[W]hen an applicant uses different terms in a claim it is permissible to infer that he intended his choice of different terms to reflect a differentiation in the meaning of those terms."). But they did not. Indeed, as discussed below, during prosecution, Zipher implied that the words "drive" and "control" each had distinct meanings. It is therefore proper to infer that Zipher intended to differentiate the terms "drive" and "control." *See id.* This inference cuts in favor of Markem's construction.

Thus, because two of the three instances of "drive" in the claim better support Markem's narrower construction, and the remaining instance could support either construction, it is most appropriate to adopt Markem's narrow construction for all three instances. *See Wilson*, 442 F.3d at 1328; *Rexnord*, 274 F.3d at 1342.

2. Usage in the Specification

The usage of "drive" and "driveable" in the specification also supports Markem's narrower construction. When describing the invention and preferred embodiment, the specification uses the terms "drive" and "driveable" in three different contexts: driving the spools, driving the motors, and driving the ribbon. I discuss each in turn.

(a) Driving the Spools

Most of the references to driving the spools in the specification could accommodate either proposed construction. *See, e.g.*, '572 Patent, col. 4, ll. 27-30 ("[A]n exemplary embodiment relies upon both motors which **drive** the two tape spools to drive the tape during tape transport."); '572 Patent, col. 18, ll. 35-38 ("[T]he exemplary embodiment relies upon ... the accurate control of the drive applied to the stepper motors 14 and 15 (FIG.1) which **drive** the ribbon spools.").

The remainder, however, support the narrow construction rather than the broad construction. In one instance, the specification states, "Generally the known arrangements **drive** only the spool onto which ribbon is taken up (the take-up spool) and rely upon some form of "slipping clutch" arrangement on the spool from which ribbon is drawn (the supply spool) ..." '572 Patent, col. 1, ll. 36-40. In a slipping clutch arrangement, the device controls the supply spool by applying a drag torque. Thus, stating that such an arrangement "drive[s] only the spool onto which ribbon is taken up" is nonsensical unless to "drive" the spools requires that the motors apply rotational torque, not drag torque, to the spools. In another instance, the specification states, "[I]f motor 92 is pulling, the drive circuit 108 for that motor is enabled and therefore the rotation angle for the spool being **driven** (94) is known. The drive circuit for the motor being pulled (93) is disabled (line 104 low). Thus motor 93 acts as a generator and a back-emf is generated across each of the motor windings ..." '572 Patent, col. 23, ll. 35-40. In other words, the specification describes a circumstance in which the take-up motor is energized to rotate and the supply motor is de-energized. In this context, the fact that only the take-up spool is described as being "driven" suggests that driving a spool means actively rotating it, not passively or indirectly controlling its motion.

(b) Driving the Motors

When referring to driving the motors, the specification mostly uses the term "drive" in ways that imply motion but that do not clearly support Markem's narrower construction. For example, the specification states at one point, "[I]f the tape is traveling in one direction between the spools both stepper motors are **driven** in that direction, and conversely when the ribbon is being driven in the opposite direction both stepper motors are **driven** in that opposite direction." '572 Patent, col. 18, ll. 39-43. The specification also states, "[W]hen the magnitude of the difference in current falls outside an acceptable tolerance band, the previously assumed ratio of the spool outside diameters is adjusted, resulting in a small change in the speed at which the two motors are **driven**." '572 Patent, col. 25, ll. 35-39.

In one instance, however, the specification states that the motors are "driven" to apply a decelerating torque to the spools: "[T]he supply spool motor is **driven** by pulses to cause deceleration. The application of deceleration pulses to the supply spool motor in synchronism with motor rotation is achieved by monitoring the back-emf generated in one winding of that motor, and then energizing that winding at an appropriate time to apply a decelerating torque." '572 Patent, col. 20, ll. 1-7. This usage is inconsistent with Markem's construction of "drive," which requires that the torque be used to rotate the spools rather than impede their rotation.

(c) Driving the Ribbon

The specification repeatedly refers to "driving" the ribbon. Each usage requires some kind of motion, which is consistent with defining "drive" as "rotate." FN6 For example, the specification states, "If the clutch force is too great the ribbon transport system may have inadequate power to **drive** the ribbon throughout the range of spool diameters from a new supply roll to an empty supply roll." ' 572 Patent, col. 1, ll. 61-64. It also states, "The tape drive may be incorporated in a printing apparatus comprising a housing, a print head mounted on a print head support assembly which is displaceable relative to the housing in a direction parallel to a print ribbon path along which a ribbon is **driven** by the tape drive ..." ' 572 Patent, col. 7, ll. 35-39.

FN6. Zipher argues that the idea of "driving the print ribbon" is inconsistent with construing "drive" as "rotate," because rotating the ribbon would twist it rather than advance it. This argument has no merit. When the spools cause the ribbon to advance, they do so by unwinding the ribbon from the supply spool and winding it onto the take-up spool. It is entirely accurate to describe these acts of winding and unwinding as "rotating" the ribbon, because the ribbon is in fact rotating on axes perpendicular to the direction of ribbon advance.

(d) Reconciling the Usages in the Specification

Within the specification, "drive" is used in three ways: driving the spools, driving the motors, and driving the ribbon. The only usages directly relevant to the claim's usage of "drive" or "driveable," however, are those in which the specification describes driving the spools. And when the specification uses "drive" to refer to the spools, it supports Markem's narrower construction of rotating the spools rather than merely controlling them.

Although "drive" can sometimes mean something other than "rotate" when applied to subjects other than the spools, I give this fact less weight because of the difference in subject. As explained above, just as "driving" a car is different from "driving" the wheels of a car, "driving" the spools may differ from "driving" the motors or the ribbon. Accordingly, I find that the specification weighs in favor of adopting Markem's construction of "drive" and "driveable."

3. Prosecution History

During prosecution, application claim 68 is the claim that eventually became patent claim 1. Markem and Zipher disagree, however, on the significance of various amendments to application claim 68 and the relevance of the Examiner's decision to reject certain other claims on which application claim 68 originally depended. For that reason, I discuss the amendments in some detail below.

When first submitted to the Examiner on December 13, 2005, application claim 68 read:

A tape drive as in claim 64 or 65 wherein: said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between upper and lower limit values and then controls said motors to add or subtract the calculated length of tape to the tape extending between said spools. (M012552-53.FN7)

FN7. Because both of the parties use the Bates-numbered pages of Exhibit 4 to Markem's Opening Claim Construction Brief when referring to the prosecution history, I do so as well.

On April 17, 2006, the Examiner rejected eleven of the application claims, including claims 64 and 65, as anticipated by Barrus, a prior art ribbon motor controller that employed a dual motor pull-drag system. (M011659); *see* U.S. Patent No. 5,366,303 (filed Nov. 22, 1994) ("Barrus"). The Examiner noted, however, that application claim 68 would be allowable "if rewritten in independent form including all of the limitations of the base claim and any intervening claims." (M011663.)

On July 6, 2006, Zipher significantly altered the scope of application claim 68 by amending it as follows:

A tape drive *comprising*:

two motors, at least one of which is a stepper motor;

two tape spool supports on which spools of tape may be mounted, each spool being drivable by a respective one of said motors;

a controller adapted to control energization of said two motors such that tape is transported in at least one direction between spools of tape mounted on the spool supports;

wherein the controller energizes both said motors to drive the spools in a tape transport direction, and

said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between *predetermined* limit values and controls said motors to add or subtract the calculated length of tape to *or from* the tape extending between said spools.

(M011644-45.)

The newly-added language largely tracked the wording of the rejected claims 64 and 65, except that the fourth element ("wherein the controller energizes both said motors to drive the spools in a tape transport direction") omitted the phrase "pushpull." FN8

FN8. Claims 64 and 65 specified that the controller energized the motors "so as to push-pull drive the spools in a tape transport direction ..." (M012552.)

Concurrent with this amendment to application claim 68, Zipher traversed the Examiner's rejection of the other related claims. (M011650.) Zipher argued that these claims were distinguishable from Barrus because "the claims require that the controller is operative to energize both motors to drive the spools of tape in the direction of tape transport," whereas Barrus teaches "that only one of the motors is energized to drive a spool of tape in the direction of tape transport [with] the other being controlled to provide drag." (M011650-51.)

In September 2006, Zipher and the Examiner continued to discuss whether the patent was sufficiently distinct from Barrus. The Examiner's interview summary from the September 6, 2006, interview states:

Discussed the differences between the instant invention and the applied prior art. Especially the feature regarding "the controller is operative to energize both motors to drive the spools of tape in the direction of

tape transport". [sic] Further consideration and/or search will be made regarding the amended claim 68. (M011638.)

The Examiner's interview summary from the September 7, 2006, interview states:

Discussion regarding the status of claim 68 and additional languages have been discussed [sic] between the Examiner and Mr. Nelson to more clearly define [sic] the scope of claim 68. The amended languages have been agreed to and Mr. Nelson has authorized the Examiner to do the Examiner's Amendment. (M011623.)

Zipher's interview summary, encompassing both interviews, offers a somewhat different characterization of what concerns the Examiner expressed and the purpose of his amendments. Although the Examiner's interview summaries name no specific claims other than claim 68 and do not draw distinctions between the Examiner's concerns regarding claim 68 and his concerns regarding the other claims, Zipher's interview summary states that the discussions focused on "the patentability of the claims (primarily independent claim 4) with respect to the Barrus Patent" and "minor changes to claim 68 to improve the style of the claim." (M011629-30.)

Ultimately, the Examiner amended the application with Zipher's consent to cancel several claims (including claim 4) and amend claim 68 as follows:

A tape drive comprising:

two motors, at least one of which is a stepper motor;

two tape spool supports on which spools of tape may be mounted, each spool being drivable by a respective one of said motors;

a controller adapted to control energization of said two motors such that tape is transported in at least one direction between spools of tape mounted on the spool supports;

wherein the controller energizes both said motors to drive the spools in a tape transport direction, and

said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between predetermined limit values and controls said motors to *drive the spools* to add or subtract the calculated length of tape to or from the tape extending between said spools. (See M011621.)

As his reason for allowance, the Examiner stated:

Claims 68 and 72 have been indicated for allowance because the prior art fails to teach the combination of a tape drive including a controller calculates a length of tape to be added to or subtracted from tape extending between the spools in order to maintain tension in the tape between predetermined limit values and controls the motors to drive the spools to add or subtract the calculated length of tape to the tape extending between the spools. (M011621.)

Zipher claims that this prosecution history shows that only the other application claims, not claim 68, were rejected in favor of Barrus. Zipher further argues that any amendments to application claim 68 were purely

for stylistic purposes rather than to escape rejection, and that the prosecution history therefore provides no assistance in construing the claim. I find this interpretation of the prosecution history unpersuasive, because the only support for it comes from Zipher's own self-serving interview summaries. Nothing in the Examiner's own summaries or the other communications contained in the prosecution history suggests that the amendments in question were purely stylistic in nature or that the Examiner's discussions of Barrus were irrelevant to application claim 68. Faced with the choice between relying upon Zipher's self-serving summary or relying upon the Examiner's summaries, I choose the latter. *See* *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1270 (Fed.Cir.1986) (holding that documents submitted by the patentee during prosecution may be considered for claim interpretation purposes, but "might very well contain merely self-serving statements which likely would be accorded no more weight than testimony of an interested witness or argument of counsel. Issues of evidentiary weight are resolved on the circumstances of each case.").

Markem argues that the prosecution history shows that the final amendment to claim 68 was made to avoid Barrus. Markem's argument proceeds in two steps: first, that the arguments Zipher made to distinguish the rejected claims from Barrus rely upon a narrower definition of "drive" than the one Zipher now adopts; FN9 and second, that the similarities between claim 68 and the rejected claims adequately support the inference that the Examiner's amended claim 68 to avoid Barrus.

FN9. Markem is not asserting prosecution disclaimer, *see* *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed.Cir.2003) ("[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender."), but rather arguing that the amendment should be construed in light of Zipher's arguments to distinguish Barrus.

When Zipher was applying for the patent, it sought to distinguish Barrus by claiming that its invention energizes "both motors to drive the spools of tape in the direction of tape transport," whereas Barrus energizes only one motor "to drive a spool of tape in the direction of tape transport [with] the other being *controlled* to provide drag." (M011650-51) (emphasis added). As Markem points out, this argument contrasts the term "drive" with the term "control" to signify the key difference between the '572 Patent and Barrus: rather than using both motors to actively rotate the spools together for a combination of tape advance and tension control, Barrus uses one motor to actively rotate the spools and the other only to apply a resistive torque for tension control purposes.FN10 Zipher's use of this linguistic contrast to distinguish Barrus is inconsistent with the idea that "drive" could include the use of a holding torque as well as active rotational torque.FN11

FN10. Barrus discloses a pull-drag device in which the take-up motor provides a pulling torque in the direction of tape transport and the supply motor provides a variable drag torque purely for tension control purposes. Barrus, col. 3, ll. 32-37. This drag torque is supplied by a de-energized supply motor in which the controller adjusts the drag torque by use of either resistor combinations or a variable impedance amplifier. *Id.*, col. 4, ll. 5-15.

FN11. During oral arguments, Zipher argued that the prior art was distinguished based on the difference between controlling the tape for tape advance purposes ("drive") and controlling the tape for tension control purposes ("control"). This attempted gloss on the prosecution history is unconvincing, however, because it would make the use of the term "drive" misleading or wrong in the context of the patented device, which

uses motorized advance in the direction of tape transport for *both* tape advance and tension control purposes.

The more difficult question, however, is whether this inconsistency guided the Examiner's decision to add the phrase "drive the spools to" in claim 68. Markem argues that it did. The Examiner's September 6 interview summary states that they discussed distinguishing the prior art from "the instant invention," and specifically references language from claim 4 that is extremely similar to the language of claim 68. The summary also states that the Examiner will give further consideration to claim 68. Nothing about this suggests that he considered the issues raised by claim 68 to be distinct from those raised by the analogous language in claim 4. Similarly, the Examiner's September 7 interview summary states that the interview dealt with "[d]iscussion regarding the status of claim 68 and additional languages," which suggests that the Examiner's concerns related to *all* of the claims then extant, including claim 68. Nevertheless, the Examiner's interview summary is hardly a model of clarity; he never specifies the precise reasons for the amendment to claim 68. Accordingly, the most that can be said about the history of amendments to the other claims is that it leaves unchanged my construction of "drive" and "driveable" in patent claim 1 as derived from the other intrinsic evidence. *See N. Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1295 (Fed.Cir.2000) ("The plain and ordinary meaning of claim language controls, unless that meaning renders the claim unclear or is overcome by a special definition that appears in the intrinsic record with reasonable clarity and precision.").

4. Reconciling the Claim Language, Specification Language, and Prosecution History

Based on the foregoing, the claim language supports Markem's interpretation, as does the most relevant language from the specification. Additionally, the prosecution history, though informing my discussion of the claim language, does not cut strongly in either direction. Accordingly, I adopt Markem's construction and construe "drive" and "driveable" to mean, respectively, "rotates" and "rotateable."

C. Whether the Patent Requires Touchless Tension Measurement

Markem argues that the phrase "said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between predetermined limit values" should be construed to require that the device measure tension in the tape, and that it do so without contacting the tape. (Markem Corp.'s Opening Claim Construction Br. 27.) Zipher argues that it would be improper to add such limitations because this would be an improper importation of limitations from the preferred embodiment into the claims.

As a general rule, it is improper to read in limitations from the specification that do not appear in the claim. *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed.Cir.2004) ("Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim."). As the Federal Circuit succinctly put it over twenty years ago, "Specifications teach. Claims claim." *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 n. 14 (Fed.Cir.1985). Markem argues, however, that the measurement of tension is a necessary and inherent predicate for maintaining the tape tension within predetermined limits because the controller cannot calculate an appropriate length of tape to add or subtract for tension correction purposes without first knowing the existing tension in the tape. Markem further argues that using a contactless means of tension measurement that occurs during the rotation of both motors is a necessary and inherent aspect of such measurement because the specification does not describe any other method of such measurement.

Markem cites *Honeywell International, Inc. v. Universal Avionics Systems Corp.*, 488 F.3d 982 (Fed.Cir.2007), and *Network Commerce, Inc. v. Microsoft Corp.*, 422 F.3d 1353 (Fed.Cir.2005), to support its two related arguments. In *Honeywell*, the Federal Circuit construed a patent directed at terrain warning systems that help airplane pilots avoid collisions with mountains and hillsides. 488 F.3d at 989. In particular, the court relied upon the specification to determine that the term "look ahead distance" in the claim included both speed and time components, even though the claim included no limitations regarding the time component. *Id.* at 990. Reading this time component into the definition was appropriate, the court held, because the entire concept of a look ahead distance requires that *both* speed and time and be taken into account. *Id.* In *Microsoft*, the Federal Circuit construed a patent directed at the purchasing of software and audio files over a computer network. 422 F.3d at 1355. The court relied on the specification to construe the term "download component" in the claim, which was not a term of art and was not defined anywhere in the claim. *Id.* at 1360-61. The specification made it "clear that the download component must include a boot program, and that the boot program interacts directly with the operating system of the computer...." *Id.* Consequently, the court held, it was appropriate to read these attributes into the definition of "download component." *Id.* at 1361.

As to the measurement of tension, I find that some method of deriving a tension measurement, whether directly or indirectly, is a necessary predicate to maintaining tension "between predetermined limit values." '572 Patent, col. 28, ll. 47-48. Without having a reasonable estimate of the current tape tension, it is not possible to identify whether the tension is approaching or exceeding the limit values. I do not find, however, that the patent claims any particular means of measuring or estimating the tape tension. The mere fact that the preferred embodiment uses a touchless method of tension measurement does not require that I read that method into the claim. *See SuperGuide*, 358 F.3d at 875 ("[A] particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment."). This is particularly true when, as here, nothing in the claim itself suggests any particular method of tension measurement. *See Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed.Cir.2003) ("[T]here is sometimes a fine line between reading a claim in light of the written description and relevant prosecution history, and reading a new limitation into the claim. However, interpreting what is meant by a word in a claim is not to be confused with adding an extraneous limitation ..., which is improper." (internal cites and quotations omitted)).

D. Whether the Patent Claims Only a Dual-Spool Correction Step

Markem argues that the phrase "said controller ... controls said motors to drive the spools to add or subtract the calculated length of tape to or from the tape extending between said spools" should be construed to require that both spools rotate together during tension correction. In support of this construction, Markem points to language in the specification describing the preferred embodiment. The claim language itself, however, is ambiguous enough to encompass either one motor driving a single spool or both motors driving the spools together. I decline to import this limitation from the preferred embodiment into the claim. *See SuperGuide*, 358 F.3d at 875. Accordingly, I find that the claim does not require that both spools rotate together during the correction step.

IV. CONCLUSION

For the foregoing reasons, I construe "drive" and "driveable" to mean, respectively, "rotate" and "rotateable." I further construe the phrase "said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between predetermined limit values" to require the derivation of a tension measurement or estimate, but without

claiming any particular means of doing so. Finally, I construe the phrase "said controller ... controls said motors to drive the spools to add or subtract the calculated length of tape to or from the tape extending between said spools" to require that at least one spool rotate during the correction step, but not necessarily both spools.

SO ORDERED.

APPENDIX A

Claim Term or Phrase	Markem Proposed Construction	Zipher Proposed Construction
"drive"	"rotate"	"control the tape spools"
"driveable"	"rotateable"	"capable of being controlled"
"said controller calculates a length of tape to be added to or subtracted from tape extending between said spools in order to maintain tension in said tape between predetermined limit values"	"while both motors are rotating to move the tape in the tape transport direction, the control of the motors is used to measure tape tension without contacting the tape, and the controller uses the measured tension value to calculate a length of tape to either be added to or subtracted from the total length of tape extending from the take-up spool to the supply spool, such that the tension in the tape is kept between a predetermined low limit value and a predetermined high limit value during tape transport"	"the controller derives by a process an amount of tape to be added to or removed from the tape extending between the spools so that tension in the tape is maintained within acceptable limits"
"said controller ... controls said motors to drive the spools to add or subtract the calculated length of tape to or from the tape extending between said spools."	"the controller controls both the motor that rotates the takeup spool support and the motor that rotates the supply spool support, so that both spools of tape rotate to either add or subtract the length of tape calculated by the controller"	"the controller controls the motors to drive the spools so as to add or remove the determined amount of tape to or from the tape extending between the tape spools"

D.N.H.,2008.
Markem Corp. v. Zipher Ltd.

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