

United States District Court,
D. Connecticut.

HALE PROPELLER, L.L.C,
Plaintiff/Counter-Defendant.

v.

RYAN MARINE PRODUCTS PTY., LTD., et al,
Defendants/Counter-Plaintiffs/Third-Party Plaintiffs.

v.

Michigan Wheel Corp., et al,
Third-party Defendants.

No. 3:98 CV 1248(GLG)

July 24, 2001.

Holder of patent on device for measuring pitch of propellers brought patent infringement action against alleged infringer in federal district court in Virginia. Alleged infringer brought suit against patent holder seeking declaratory judgment of invalidity and noninfringement. Following consolidation, motions were made to construe claims, and for summary judgment of invalidity and noninfringement. The District Court, Goettel, J., held that: (1) claim was limited to device using roller on tip of probe; (2) claim contemplated use of hand crank to turn propeller during testing; (3) claim covered use of computer as well as electric circuit; (4) patent was valid; and (5) patent was not infringed.

Order accordingly.

4,411,073. Valid And Not Infringed.

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OPINION

GOETTEL, District Judge.

This patent dispute concerns devices that measure the pitch of propeller blades. Plaintiff Hale Propeller L.L.C. ("Hale"), the alleged infringer, filed a motion for construction of claims 1 and 6 of U.S. Patent No. 4,411,073 ("the '073 patent"), which is held by Defendant Ryan Marine Products Pty., Ltd. ("Ryan Marine"). Hale concurrently filed a motion for summary judgment of non-infringement of the '073 patent. Third-party Defendant Michigan Wheel Corporation, the exclusive North American distributor of Hale's device, joined in Hale's motions and filed its own motion for summary judgment of patent invalidity, in which Hale joined. The Court held oral argument on the three motions on May 31, 2001.

For the reasons set forth below, the Court GRANTS the motion for claims construction [**Doc. # 134**] and construes the disputed claims. In addition, we GRANT Hale's motion for summary judgment of non-infringement [**Doc. # 131**] and DENY Michigan Wheel's motion for summary judgment of patent invalidity [**Doc. # 130**].

BACKGROUND

On October 25, 1983, the U.S. Patent and Trademark Office ("PTO") issued the '073 patent for "an instrument for measuring the pitch of propeller blades" to Defendant Terence J. Ryan ("Ryan"), an Australian citizen. Ryan assigned the patent on May 21, 1998 to Ryan Marine, an Australian corporation which employs Ryan and in which he is the chief shareholder and managing director. On June 12, 1998, Ryan Marine brought an action in the Eastern District of Virginia for willful infringement against Hale and its owners, Randall Hale, Jr. and Randall Hale, III. On July 1, 1998, Hale filed this action against Ryan, Ryan Marine, and two other business entities substantially owned and controlled by Ryan, Propeller Dynamics Pty. Ltd. of Australia and Propeller Dynamics, Inc. of Maryland, seeking a declaratory judgment of non-infringement, invalidity, and unenforceability of the '073 patent. Hale also asserted claims of unfair competition, tortious interference with contract, violation of the Lanham Act, and antitrust violation. The two actions were consolidated on December 29, 1998, after Ryan Marine's action was transferred to this District on October 27, 1998. The Court has original jurisdiction over this patent dispute pursuant to 28 U.S.C. s. 1338.

Summary Judgment Standard

A motion for summary judgment may not be granted unless the Court determines that there is no genuine issue of material fact to be tried and that the moving party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c). The burden of demonstrating the absence of a genuine dispute as to a material fact rests with the moving party. *See* Adickes v. S.H. Kress & Co., 398 U.S. 144, 157, 90 S.Ct. 1598, 26 L.Ed.2d 142 (1970). In assessing the record to determine whether any genuine issues of material fact exist, this Court is required to resolve all ambiguities and draw all permissible factual inferences in favor of the non-moving party. *See* Skubel v. Fuoroli, 113 F.3d 330, 334 (2d Cir.1997); Heilweil v. Mount Sinai Hosp., 32 F.3d 718, 721 (2d Cir.1994). The moving party may obtain summary judgment by showing that little or no evidence may be found in the record in support of the nonmoving party's case. *See* Celotex Corp. v. Catrett, 477 U.S. 317, 322, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986); Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 247-48, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986). The non-moving party bears the burden of coming forward with sufficient evidence to negate the movant's position and to show the existence of genuine issues of material fact. *Biotec Biologische Naturverpackungen GmbH & Co. KG v. Biocorp, Inc.*, 249 F.3d 1341, 1353

(Fed.Cir.2001). Bald allegations and conclusory statements devoid of support in the record are insufficient to meet the non-movant's burden of production necessary to withstand summary judgment. *See id.* "It is not the trial judge's burden to search through lengthy technologic documents for possible evidence." *Id.* "The party opposing the [summary judgment] motion must point to an evidentiary conflict created on the record at least by a counter statement of a fact or facts set forth in detail in an affidavit by a knowledgeable affiant." *Barmag Barmer Maschinenfabrik AG v. Murata Mach., Ltd.*, 731 F.2d 831, 836 (Fed.Cir.1984).

Suits for patent infringement typically raise numerous and complex fact issues that make them inappropriate for summary disposition. *Chore-Time Equip., Inc. v. Cumberland Corp.*, 713 F.2d 774, 778 (Fed.Cir.1983). However, when no rational jury could find in favor of the nonmoving party because the evidence in support of its case is so slight, no genuine issue of material fact exists and the grant of summary judgment is proper. *See id.* at 778-79; *Heilweil*, 32 F.3d at 721; *Biotec*, 249 F.3d at 1353.

Ryan Marine, in its Local Rule 9(c)(2) statement, denied almost all of the factual statements proffered by Hale in its Local Rule 9(c)(1) statement, while concurrently denying the existence of any genuine issues of material fact for trial. Unless Ryan Marine means that none of the disputed facts are material to this proceeding, its statement is inherently inconsistent. To the extent Ryan Marine has failed to support its position with evidence, we deem Hale's facts admitted based on Ryan Marine's failure to comply with the District Court's Local Rules of Civil Procedure. *See D. Conn. Loc. R. Civ. P. 9(c)*. In accordance with Rule 56(c) of the Federal Rules of Civil Procedure, the Court has gleaned the undisputed facts from the parties' pleadings, depositions, answers to interrogatories, admissions on file, affidavits, and exhibits. In so doing, we have construed the facts in the light most favorable to Ryan Marine, the non-moving party.

The '073 Patent

The '073 patent includes one independent claim (Claim 1) and eleven dependent claims. The parties dispute the proper construction of clauses b, c, and f of Claim 1, as well as dependent Claim 6. Claim 1 recites:

An instrument for measuring the pitch of a propeller blade comprising:

- (a) a probe shaft mounted for axial movement;
- (b) means for maintaining the probe shaft in constant contact with the propeller blade at a fixed radial distance from the center of the blade;
- (c) means for providing continuous relative rotation between the probe shaft and the blade;
- (d) means for determining the amount of relative angular rotation between the blade and probe shaft;
- (e) means for determining the amount of axial movement of the probe shaft during the relative angular rotation; and
- (f) means for providing a direct reading of the pitch of the propeller blade at the radial distance at which the probe shaft is located and over the part of the blade traversed by the probe shaft based on the amount of relative angular rotation and the axial movement of the probe shaft.

Claim 6 recites:

An instrument as claimed in claim 1 wherein the probe shaft passes through a housing and is journaled for axial movement relative thereto, a roller in the housing held against the probe shaft and caused to rotate on axial movement of the probe shaft, and means attached to the roller whereby the distance of movement of the probe shaft can be determined.

Prosecution History of the '073 patent

Ryan first filed his U.S. patent application on July 13, 1981. The application stated sixteen claims, one independent and fifteen dependent. Claim 1 recited, in part: "An instrument for measuring the pitch of a propeller blade including a probe adapted to be brought into contact with and remain in contact with the propeller blade at a fixed radial distance from the centre of the blade" The PTO rejected every claim in the application for a variety of reasons. In part, the patent examiner stated that the claims which taught means for "biasing" or exerting downward or inward force on the probe to maintain it in contact with the blade, or means for operating the device in such an orientation that the probe would be maintained in contact with the blade by gravity, were unpatentable as obvious modifications of prior art, specifically, the Metcalf patent.

Ryan amended his application and refiled it on October 4, 1982. He eliminated Claims 1 and 13 through 16, and added Claim 17, a new independent claim, and amended most of the remaining claims. Claim 17 replaced the dropped Claim 1, revising the language to add the word "constant" to the claim element ("means for maintaining the probe in constant contact with the propeller blade"), as well as many other revisions. Ryan distinguished his application from the prior art, including the Bryn and Taylor patents, in that he claimed continuous relative rotation of the blade and the probe, as well as the probe remaining in constant contact with the blade during the measurement process.

The amended application was rejected by the PTO in its entirety on October 21, 1982. The examiner stated that Claim 17 was anticipated by the Eby patent, and rejected all of the claims for failing to describe the invention in full, clear, concise and exact terms.

Ryan refiled his amended application on February 18, 1983, amending the language in accordance with the patent examiner's requested changes, and arguing that his claimed invention was not anticipated by the Eby patent because the Eby device did not provide for a direct readout of the pitch measurement, which Ryan claimed was a distinguishing feature of his device.

Hale's device

Hale maintains that it began developing its device, the "Hale Propeller MRI" ("MRI") in early 1997. According to Hale's description, the MRI consists of a turntable mounted on a work bench. The propeller to be measured is mounted on the turntable, which is rotated manually. There are no gears or worm-drives to accomplish the necessary rotation. A vertical support beside the turntable extends an arm consisting of two "parallel ways" over the turntable. The arm holds the probe shaft which is positioned over the propeller blade. The probe shaft has a pointed tip which contacts and slides across the blade of the propeller while the propeller is manually rotated. There are three optical encoders (one underneath the turntable, and two on a carriage located on the "parallel ways") which transmit measurements to a computer for calculating the propeller parameters, including the pitch of the blades. There are no electric circuits to provide direct readouts of the measurements.

ANALYSIS

I CLAIM CONSTRUCTION

Claim construction is the "process of giving proper meaning to the claim language." *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed.Cir.1997). The Court considers the intrinsic record of evidence to ascertain the meaning of the claims. Specifically, the Court considers three sources: the language of the claims themselves, the patent specification or written description, and the prosecution history. *Markman v. Westview Instruments, Inc.* (" *Markman I* "), 52 F.3d 967, 979 (Fed.Cir.1995) (en banc), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

The first step in reviewing the intrinsic evidence is to look at the words of the claims themselves to determine the scope of the invention. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996). Generally, words in a claim are given their "ordinary" meaning. *Id.* However, a patentee may use terms in a manner other than their ordinary meaning if the special meaning is clearly stated in the patent specification or file history. *Id.*

[1] Claims must be read in light of the specification. *Markman I*, 52 F.3d at 979. The patent specification is "the single best guide to the meaning of a disputed claim term." *Vitronics*, 90 F.3d at 1582. "However, limitations from the specification may not be read into the claims.... In particular, the court should not limit the invention to the specific examples or preferred embodiment found in the specification." *Lawler Mfg. Co. v. Bradley Corp.*, No. IP98-1660-C-M/S, 2000 WL 33281119, at (S.D.Ind. Nov. 30, 2000) (citation and footnote omitted). However, as will be discussed later, claim limitations expressed in means-plus-function form pursuant to 35 U.S.C. s. 112, paragraph 6, are an exception to this rule. *See Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1042 (Fed.Cir.1993).

The third source of intrinsic evidence is the patent's prosecution history. "Prosecution history is an important source of intrinsic evidence in interpreting claims because it is a contemporaneous exchange between the applicant and the examiner." *Desper Prods., Inc. v. QSound Labs, Inc.*, 157 F.3d 1325, 1336-37 (Fed.Cir.1998). The prosecution history consists of the complete record of the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. *Vitronics*, 90 F.3d at 1582. "The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed.Cir.1995); *see also Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki*, 234 F.3d 558 (Fed.Cir.2000), *cert. granted*, 533 U.S. 915, 121 S.Ct. 2519, 150 L.Ed.2d 692 (2001).

The Court may also consider extrinsic evidence, such as expert testimony or dictionaries, " 'to aid the court in coming to a correct conclusion' as to the 'true meaning of the language employed' in the patent." *Markman I*, 52 F.3d at 980 (quoting *Seymour v. Osborne*, 11 Wall. 516, 78 U.S. 516, 546, 20 L.Ed. 33 (1870)).

Means-plus-function claims

"Combination claims can consist of new combinations of old elements or combinations of new and old elements." *Clearstream Wastewater Sys., Inc. v. Hydro-Action, Inc.*, 206 F.3d 1440, 1445 (Fed.Cir.2000). Combination claims consisting, in part, of old elements may, "and often do, read on the prior art." *Id.*

Combination claims may be expressed in "means-plus-function" form, pursuant to 35 U.S.C. s. 112,

paragraph 6, which permits a patentee to define the structure for performing a particular function generically through the use of a means expression, provided that the patentee discloses a specific structure or structures corresponding to that means in the patent specification. FN1 Courts interpret combination claim limitations recited in means-plus-function form according to the general principles of construction as well as the statutory limitations set forth in s. 112, paragraph 6.

FN1. The relevant part of the statute provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim 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 (2000).

The Court first determines whether the claim at issue uses the means-plus-function format such that s. 112, paragraph 6 has been invoked. Use of the term "means" creates a rebuttable presumption that the claim limitation employs the means-plus-function format. The Court then construes the function recited in the claim and determines what structures have been disclosed in the specification corresponding to the means for performing the identified function. *Kemco Sales*, 208 F.3d at 1360. *See also* *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1308 (Fed.Cir.1998).

Disclosed structure includes the structure described in a patent specification, as well as any alternative structures identified. *Serrano v. Telular Corp.*, 111 F.3d 1578, 1583 (Fed.Cir.1997). However, alternative structures that are mentioned as mere possibilities but are not specifically identified as corresponding to the means for performing the identified function are not included within the patent's scope. *See* *Fonar Corp. v. General Elec. Co.*, 107 F.3d 1543, 1551 (Fed.Cir.1997). Nonetheless, "the statute [does not] permit incorporation of structure from the written description beyond that necessary to perform the claimed function." *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed.Cir.1999). However, ignoring or omitting structure which is necessary for performing the recited function would impermissibly broaden the scope of the patent. *See id.*

'073 Patent *Claim Construction*

Hale and Michigan Wheel submitted alternative proposed constructions to the Court in connection with their motions for patent infringement and invalidity. Ryan Marine spent a great deal of time and many pages in its voluminous briefs arguing that such alternative pleading is impermissible, because the Court must construe the claims consistently in its ruling on the patent invalidity and infringement claims. We agree that the Court must construe the claims consistently. *See* *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340 (Fed.Cir.1998). However, that does not prevent the parties from arguing in the alternative. *See* Fed.R.Civ.P. 8(e)(2). Thus, to the extent that Ryan Marine attempts to transplant Michigan Wheel's proposed claim construction from its invalidity motion into Hale's non-infringement motion (and vice versa), we disregard its assertions that the constructions are "admitted" and look to the merit of the claims.

The Court considers each disputed claim limitation in turn.

Clause 1(b)

[2] Clause 1(b) recites: "means for maintaining the probe shaft in constant contact with the propeller blade at a fixed radial distance from the center of the blade." The presence of the term "means" creates a presumption that the clause employs the means-plus-function form of s. 112, paragraph 6. The recited function is "maintaining the probe shaft in constant contact with the propeller blade at a fixed radial distance from the center of the blade."

Construing the meaning of the terms of the recited function, the Court notes that the term "maintaining" means "continuing, keeping up." Webster's Third New Int'l Dictionary 1362 (1966). Continuing or keeping up an activity necessarily implies that the activity has begun. Maintaining contact therefore means making initial contact and continuing or keeping up that contact. "Constant" means "steady, uniform." *Id.* at 485. Thus, the plain meaning of the first part of the recited function is making and continuing or keeping the probe shaft in steady, uniform contact with the propeller blade. The parties do not dispute the meaning of the term "fixed radial distance," and therefore the Court need not discuss its plain meaning.

Hale argues that the phrase "center of the blade" in the second part of the function is meaningless and nonsensical, and therefore the patent is invalid. Ryan Marine asserts that persons skilled in the art of propeller blade pitch measurement would understand the reference to mean the "center of rotation of the propeller," since members of the relevant industry use the term "blade" to mean "propeller." Obviously, the use of figures of speech (here, synecdoche, the use of a part to represent the whole) is not encouraged in patent drafting. *See, e.g.,* Rackman v. Microsoft Corp., 102 F.Supp.2d 113, 123 n. 5 (E.D.N.Y.2000). Nonetheless, taken in the context of the entire patent and viewing the term from the point of view of one skilled in the art of measuring propeller blade pitch, we believe the term is understandable to mean the "center of rotation of the propeller."

Thus, the Court finds that the meaning of the recited function is making and continuing or keeping the probe shaft in steady, uniform contact with the propeller blade at a fixed radial distance from the center of rotation of the propeller.

[3] The next step in the analysis is to identify the disclosed structure for performing the recited function. Ryan Marine claims that there are several alternate structures disclosed in the specification corresponding to the means for performing the recited function. According to Ryan Marine, the structures vary depending on how the propeller to be measured is mounted for testing.

Ryan Marine asserts that the disclosed structure corresponding to the recited function in Clause 1(b) includes shafts 36 and 37 which support a housing 23 with bearings or journals 24 in its top and bottom through which the probe shaft passes so that the probe shaft is allowed free axial movement with minimal resistance permitting the probe shaft to maintain constant contact with the blade. *See* Col. 5, 11. 18-21; col. 6, 11. 1-5, Figs. 1 & 4. A locking mechanism, illustrated in Fig. 1 of the patent, permits the housing to be fixed in a position relative to the propeller so that the probe shaft is set at a "fixed radial distance" from the center of rotation of the propeller.

Thus, Ryan Marine maintains that the key structure for performing the recited function is the structure that supports and positions the probe shaft so that the tip or end of the probe contacts the propeller blade to be

measured, providing for free axial movement of the probe during the rotation of the propeller. Ryan Marine further argues that, although the roller tip is illustrated in the patent specification as the preferred embodiment, it is not necessary to perform the recited function, and therefore may not be read into the claim limitation.

The specification provides:

The other essential part of the instrument of the invention is a probe 20 which is adapted to be brought into contact with a propeller blade and which moves vertically on relative rotation of the probe and the propeller blade, the degree of movement depending upon the formation of the propeller blade.

.....

In the illustrated form, the probe 20 includes a shaft 21 which has a roller 22 or other low friction means which contacts and moves over the blade attached to its lower end.

The shaft 21 passes through a housing 23 in which there are located journals 24, shown in Fig. 4, the journals constraining the shaft 21 for axial movement relative to the housing.

Col. 5, 11. 3-17. From this language, it is apparent that the probe shaft is fixed at a specified distance from the spindle (which marks the center of rotation of the propeller) and the propeller is rotated relative to the probe shaft while measurements are being taken.

In order to permit constant contact with the blade, the specification states that "in the light form of [the] instrument illustrated in Figs. 1 to 4[,] the probe can be permitted to drop freely and in any form the probe must be able to rise freely with minimum resistance so as to quickly and accurately follow the surface of the blade" Col. 6, 11. 1-5. In a "heavier" version of the instrument, the probe may be "damped, as by an air damper" Col. 6, 11. 5-7.

The specification further provides that "as the propeller or the instrument is rotated so as the probe reaches the trailing edge of each blade[,] it will drop to its initial condition ready to pass onto the next blade." Col. 6, 11. 10-13. In this embodiment, therefore, the probe tip initially contacts each blade at its leading edge (the lower edge when the propeller is situated on a vertical spindle) and moves upward toward the trailing edge of the blade (the higher edge), after which the probe drops downward between the blades.

The specification explains that the probe shaft may be provided with a height adjustment means, such as an adjustable collar, in order to limit its downward travel between blades, so that the probe will be properly positioned to strike the leading edge of the next blade to be measured while the propeller is rotated continuously. Col. 5, 11. 60-68. Additionally, the specification provides that the probe may be counter-weighted in order to limit its downward motion or to provide inward force when the probe is used horizontally (for instance, when the instrument is used in situations to measure a ship's propeller that is too large or unwieldy to be removed from its shaft). Col. 6, 11. 14-25.

In yet another embodiment described in the specification, illustrated in Fig. 5 of the patent, "there is a probe 42 which, basically can be considered identical in concept to the probe 20 of the earlier embodiment.... [T]he probe is provided with a counterweight 43 which holds the roller 44 of the probe against the propeller blade." Col. 9, 11. 57-60.

The specification points out that:

the maintenance of a force on the probe whilst this is moving relative to the propeller aids in obtaining accurate and reproducible [sic] results as the movement of the probe is steady and any slack in the assembly is taken up and is basically held constant while movement occurs. This overcomes one of the difficulties which has occurred in previously proposed systems where the probe tends to skip relative to the surface of the propeller shaft, thus introducing errors in the point of location of the probe when readings are taken.

Col. 11, 11. 34-43.

Hale proposes the following construction of Clause 1(b):

A housing including a pair of friction-reducing journals that allow free axial movement of the probe shaft, and a roller attached to the lower end of the probe shaft that contacts and rolls over the surface of the propeller blade, or equivalent structure that keeps the probe shaft in steady, uniform contact with the blade. The structure may be further combined with counterweights and/or air dampers connected to the probe shaft and roller.

At issue in the construction of Clause 1(b), therefore, is whether a roller is an essential part of the structure identified in the specification. The patent specification also refers to "other low-friction means," however, no alternate low-friction structure is specified. Such a vague reference is insufficient to link any particular structure to the recited function. *See Fonar Corp. v. General Elec. Co.*, 107 F.3d 1543, 1551 (Fed.Cir.1997).

Ryan Marine argues that the key structure is the combination of shafts, housing, and journals which support the probe shaft, positioning the probe tip in contact with the propeller blade and providing for free axial movement of the probe shaft while the propeller is rotated relative to the probe shaft. The shafts 36 and 37, housing, journals, and locking mechanism operate together to fix the probe shaft in a position over the blade (assuming the propeller sits on a vertical spindle), and at a fixed distance from the hub of the propeller. We agree with Ryan Marine that without the provision for free axial movement, the probe tip could not move and maintain contact with the propeller blade. However, the probe tip is the actual structure that makes contact with the blade surface, and limiting the analysis to the support structure would ignore the actual point of contact between the probe tip and the surface of the blade. Viewing this clause in the context of the other clauses in Claim 1, we discern no other clause which discloses structure for making contact with the blade surface. Therefore, we find that the structure of the probe tip is a necessary part of the contours of the structure specified for maintaining constant contact with the blade surface.

The patent specification states that "[i]n the illustrated form, the probe 20 includes a shaft 21 which has a roller 22 or other low friction means which contacts and moves over the blade attached to its lower end." Col. 5, 11. 14-17. The roller appears to be a small wheel that permits the probe tip to roll over the surface of the blade. No other structure at the end of the probe shaft is described or illustrated in any of the embodiments discussed in the patent specification. As mentioned earlier, no other low friction means are specified. Therefore, the Court finds that the disclosed structure corresponding to the recited function of maintaining contact with the blade includes a roller which is attached to the lower end of the probe shaft and which contacts and moves over the blade.

In making this determination, we also consider the emphasis in the specification on preventing skipping or

chattering of the probe tip over the surface of the blade by maintaining "force on the probe," col. 11, line 34, as well as means for preventing "inaccuracies caused by ... shaft flexing." Col. 1, 11. 47-49. Hale argues that the roller is a necessary part of the structure for maintaining the probe tip in constant contact with the blade surface, because the roller prevents the probe tip from skipping or chattering across the blade surface, which apparently was a problem in the prior art. Hale also argues that the roller tip minimizes the problem of inaccurate measurement due to flexing of the probe shaft under the downward (or inward) force exerted on the shaft due to either gravity or counter-weighting sufficient to maintain the probe tip in contact with the blade surface.

In holding that the roller is disclosed structure, we do not mean that the roller is necessary structure in order for this device to function or that the device could not function without a roller on the probe tip. However, because we find that the means-plus-function limitation in Clause 1(b) discloses a roller at the lower end of the probe shaft, the scope of the patent claim is limited to structure which, *inter alia*, contains a roller or equivalent structure at the end of the probe which contacts the blade surface.

Clause 1(c)

[4] The parties also dispute the correct construction of Clause 1(c), which recites: "means for providing continuous relative rotation between the probe shaft and the blade." At issue is whether a worm or gear drive is a necessary part of the structure disclosed for performing that function. Hale, focusing on the word "continuous," argues that the disclosed structure includes a spindle rotated by a worm and worm wheel drive driven by an electric motor, or equivalent structure, for performing the function of supplying steady, uninterrupted rotation of either the probe shaft or the propeller relative to the other.

Ryan, on the other hand, claims that a worm or gear drive is not necessary structure because the rotatable spindle is capable of performing the recited function without a worm or gear drive. Ryan further maintains the term "continuous" means only that the propeller rotates while each individual blade is being measured, while the probe tip is actually in contact with the blade. Ryan insists that the propeller need not keep rotating between blades and from blade to blade in order for the rotation to be considered "continuous."

The specification provides:

The spindle 10 is provide [sic] with rotational means which, as illustrated in Fig. 2, can relatively simply be a worm 15 and worm wheel 16 with the worm being driven by an electric motor 17.

This motor whilst driving the propeller 11 does not have to be a constant speed motor as the angular displacement of the propeller is not gauged directly from the operation of the motor, but it is preferred that the motor operates continuously whilst measurements are being made, as will be discussed hereinafter.

In an even simpler form, not illustrated, the worm shaft may be extended beyond the base and be provided with a handle or the like, whereby rotation of the propeller can be directly effected by an operator.

Col. 3, 11. 55-68.

Thus, the patent teaches that rotation can be effected either by a worm or gear drive with an electric motor rotating the spindle or by manual rotation of the propeller by the device operator turning a hand-crank which is connected to the worm shaft. The motor-driven worm drive is clearly the preferred embodiment,

however a hand-cranked alternate embodiment is also disclosed. Either disclosed embodiment contains a worm drive. The patent does not disclose structure without a worm drive in which the operator grasps the propeller itself to effect rotation.

We first consider the meaning of the term "continuous." Although the plain meaning of the term is "uninterrupted," that does not clarify precisely how that term should be interpreted in the context of the claim limitation with respect to the duration of the continuous relative rotation. "Continuous" could mean that the propeller must rotate (relative to the probe) without stopping between blades through a full rotation of 360 degrees or more, or it might mean only that the propeller rotates without stopping while one blade is measured. Because the term is ambiguous, we look to the specification and to the prosecution history for clarification. The language in the specification makes clear that "it is preferred that the motor operates continuously whilst measurements are being made." In the course of prosecuting the patent application, Ryan differentiated his claimed invention from prior art (specifically, the Metcalf, Bryn, and Taylor patents) in which the probe tip made only "intermittent contact" and was screwed or clamped to an immobile blade while measurements were taken at "discrete points" along the blade surface. Ryan specified that in his claimed invention the probe maintains "constant contact" with a moving blade which rotates "continuously" during the measurement process. We conclude that the term "continuous" applies to the movement of the blade relative to the probe while the measurement is being taken. We do not interpret "continuous" to mean that the propeller must rotate without stopping between the blades.

[5] [6] Hale further argues that during the prosecution of the patent application, Ryan narrowed the claim by eliminating the hand-cranked embodiment in order to overcome the examiner's rejections. In the second office action, the examiner had rejected claim 17 (the relevant claim) because it was anticipated by prior art (specifically, the Eby patent), and because "the claimed invention is not described in such full, clear, concise and exact terms as to enable any person skilled in the art to make and use the same, and/or for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention."

Ryan addressed these objections in his remarks in the February 18, 1983 amendment, arguing that:

[t]he means for providing continuous relative rotation between the probe shaft and the blade as set forth in element c) in applicant's claim 17 finds clear basis in applicant's Figures 1 and 2 which show a spindle rotated by a gear train driven by an electric motor and which is fully described in applicant's specification beginning on page 7, beginning at line 24 and extending over onto page 8 through line 14.

Thus, the issue we must decide is whether Ryan narrowed the claim element by failing to mention in his remarks the alternate method of rotation, i.e., manual rotation of the propeller via a hand crank.

Under the doctrine of prosecution history estoppel, an applicant is barred from expanding the literal meaning of a claim through the application of the doctrine of equivalents if the applicant relinquished coverage of the subject matter during the prosecution of the patent, either by argument or by amendment. *See, e.g., CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1319 (Fed.Cir.2000). "Just as prosecution history estoppel may act to estop an equivalence argument under the doctrine of equivalents, positions taken before the PTO may bar an inconsistent position on claim construction under s. 112, para. 6." *Alpex Computer Corp. v. Nintendo Co. Ltd.*, 102 F.3d 1214, 1221 (Fed.Cir.1996) (holding that prosecution history estoppel applied to bar the plaintiff patent owner from asserting that the claim construction should cover a system using shift registers because it had specifically defined its claims during

prosecution as not covering such a system). However, in this case, Ryan did not specifically disclaim the use of a hand-cranked rotation system during prosecution. Moreover, "when, as here, the specification unambiguously described a structure as carrying out the function called for in the claim, Section 112 [paragraph 6] mandates that the claim be interpreted to encompass that structure." *Pfund v. United States*, 40 Fed. Cl. 313, 327 (1998). Thus, we find that the doctrine of prosecution history estoppel does not operate to bar Ryan Marine from asserting the alternate structure of a hand-crank connected to a worm shaft for performing the recited function in Clause 1(c). Accordingly, we find that the specification adequately discloses alternate structure of a hand-crank and worm shaft to perform the continuous relative rotation.

Clause 1(f)

[7] Clause 1(f) recites:

means for providing a direct reading of the pitch of the propeller blade at the radial distance at which the probe shaft is located and over the part of the blade traversed by the probe shaft based on the amount of relative angular rotation and the axial movement of the probe shaft.

The dispute over this clause focuses on the phrase "providing a direct reading of the pitch." The specification provides that "[n]ormally, the interrelationship between the angular rotation of the propeller and the movement of the probe is calculated automatically by a microprocessor circuit and the output is displayed directly by an LED or LCD output device." Col. 7, 11. 55-59. The parties agree that the specification discloses an electric logic circuit that outputs the pulses of the optical encoder measuring the axial movement of the probe shaft onto an LED or LCD output device. Ryan Marine argues that, in addition to the electric logic circuit and LED or LCD output device, the specification also discloses a computer as alternate structure for providing a direct readout of the pitch measurements. The specification states:

It is also readily possible to use the two readings provided by the instrument, the angular rotation of the propeller about its axis and the vertical height displacement of the probe, to provide input information into a computer which can be programmed to provide a printed or video output of the pitch of the propeller in any required form.

Col. 8, 11. 54-60. Hale, on the other hand, insists that the proper construction of this claim should limit the corresponding structure to the LCD or LED readouts. Hale interprets the language in the specification to mean that a computer could be used in conjunction with, rather than in lieu of, the LCD or LED readouts, but that a computer alone could not perform the recited function act as alternate structure. Hale urges the Court to interpret the word "instrument" in the specification language cited above to include the electric logic circuit. Based on that interpretation, Hale maintains that the computer could be used to store and manipulate the information obtained by the "instrument," but that the electric logic circuit could not be removed or replaced by the computer. In the alternative, Hale argues that the computer would have to be a special-purpose computer limited to performing the same algorithms described in the specification in connection with the electric logic circuit.

We do not read the specification so narrowly. We think the specification adequately discloses a computer as alternate structure in lieu of the electric logic circuit and LCD or LED output devices for performing the function of providing a direct readout of the pitch measurements. In addition, the computer need not be a special purpose one, as the specification points out that the computer "can be programmed to provide a printed or video output of the pitch of the propeller in any required form."

Claim 6

[8] Claim 6 recites:

"An instrument as claimed in claim 1 wherein the probe shaft passes through a housing and is journaled for axial movement relative thereto, a roller in the housing held against the probe shaft and caused to rotate on axial movement of the probe shaft, and means attached to the roller whereby the distance of movement of the probe shaft can be determined."

A dependent claim incorporates by reference all the limitations of the claim on which it is based. 35 U.S.C. s. 112, para. 4. Thus, Claim 6 incorporates all the limitations of Claim 1. The parties' dispute centers on the final clause, "means attached to a roller ...," which is written in means-plus-function format. The function recited is determining the distance movement of the probe shaft.

Hale proposes that the clause be construed to mean an optical encoder or equivalent structure attached to the roller to obtain information regarding the magnitude of movement of the probe shaft. Ryan Marine, on the other hand, proposes "an optical encoder attached to the roller and in communication with the computer or other disclosed logic component of the instrument of the '073 patent." These proposed constructions differ only in Hale's mention of equivalent structure and in Ryan's mention of a computer as disclosed structure. The specification does not disclose a computer as alternate structure for performing the function recited in the final clause, i.e., determining the distance movement of the probe shaft. Clearly, the optical encoder attached to the roller performs that function. Nonetheless, this claim imports the limitations of Claim 1, and we have already determined that the specification adequately discloses a computer as alternate structure for providing a direct readout of the pitch (based on measurements of the angular rotation and axial movement of the probe shaft). Thus, we find that the proper construction of Claim 6, when viewed in its entirety, includes a computer which receives measurement data from the optical encoder.

II CLAIM COMPARISON

[9] Claim comparison is a question of fact. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 384, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). This analysis breaks down into two categories: patent validity and patent infringement. When an accused infringer presents a defense of patent invalidity, the "better practice" is to inquire fully into the validity of the patent before determining the issue of infringement. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 330, 65 S.Ct. 1143, 1145, 89 L.Ed. 1644 (1945).

A. Patent Invalidity

A duly issued patent is presumed to be valid. 35 U.S.C. s. 282. Each claim is presumed valid independently of the validity of the other claims. *Id.* An alleged accuser defending on the grounds of patent invalidity bears the burden of proving invalidity by clear and convincing evidence. *Id.*; *Al- Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1323 (Fed.Cir.1999).

Michigan Wheel argues that the '073 patent is invalid on three grounds: (1) anticipation under 35 U.S.C. s. 102(b); FN2 (2) obviousness under 35 U.S.C. s. 103; FN3 and (3) indefiniteness under 35 U.S.C. s. 112.FN4 Specifically, Michigan Wheel claims, first, that each limitation in Claims 1 and 6 was anticipated by prior art and therefore the claimed invention was not novel, and second, that the claimed invention was obvious in light of the prior art due to insubstantial differences between certain elements of the claimed

invention and prior art. Both of these grounds are predicated on a claim construction of the '073 patent which excludes a roller or equivalent structure on the probe tip from the identified structure in Clause 1(b).

FN2. The relevant part of the statute provides:

A person shall be entitled to a patent unless-

.....

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States

35 U.S.C. s. 102.

FN3. The statute provides:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. s. 103.

FN4. The relevant part of the statute provides:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. s. 112, para. 1.

Michigan Wheel argues as its third ground that certain language in Clause 1(b) ("the center of the blade") is impermissibly vague and fails to describe the claimed invention in sufficiently "full, clear, concise, and exact terms," as required by 35 U.S.C. s. 112. Having already determined that this language is sufficiently clear to one skilled in the art of propeller blade measurement to withstand challenge, *see supra* Part I (discussing clause 1(b)), we focus our attention on the anticipation and obviousness grounds.

1. Anticipation

[10] When a prior art reference discloses every element of the invention of any single patent claim and otherwise meets the requirements of 35 U.S.C. s. 102, it anticipates the claimed invention and render the patent claim invalid. In *re Donohue*, 766 F.2d 531, 534 (Fed.Cir.1985). In making its invalidity analysis, the Court must construe each element of the patent claim consistently with the infringement inquiry and must

identify corresponding elements disclosed in the anticipating reference. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 882 (Fed.Cir.1988).

Michigan Wheel points to an unexamined Japanese patent publication which predates the '073 patent by six years.FN5 The Japanese publication discloses a typical pitchometer which has a probe shaft which contacts a propeller blade surface at a fixed radial distance from the center of rotation of the propeller. The "movable detecting end" of the probe shaft is maintained in contact with the blade surface by the weight of the probe shaft. Although the publication does teach continuous relative rotation between the propeller and the probe, it does not specifically teach the use of a worm or gear drive with an electric motor rotating the spindle or hand-crank connected to a worm shaft to achieve that function. The publication also discloses the use of encoders (a "pulse type reversible distance meter" and a "pulse type reversible rotating meter") to measure the amount of the probe's linear and angular movement and to output the measurement data via an electrical circuit ("gate counting circuit") to a readout ("displaying circuit").

FN5. Ryan Marine disputes the accuracy and authenticity of the Japanese publication which Michigan Wheel submitted without a certificate of authenticity. Hale has since submitted to the Court a certificate of authenticity from the Vice Consul for Consular Affairs for Japan certifying the authenticity of the Japanese publication. In addition, one of the two translations submitted by Michigan Wheel was prepared domestically by a translation service which has certified to its accuracy. The Court is satisfied that it may properly consider these documents.

After careful review of the record evidence, we find that the Japanese publication does not disclose a roller or equivalent structure on the probe's "movable detecting end." Nor does it teach bearings or journals to allow the probe shaft to remain in contact with the blade surface. Similarly, it does not teach a worm or gear drive with an electric motor rotating the spindle or hand-crank connected to a worm shaft to perform the function of continuous relative rotation of the propeller. Having construed the '073 patent as requiring those elements which the Japanese publication lacks, we need go no further in determining the full scope of the Japanese publication's claims. Because the Japanese patent fails to meet every claim limitation of the '073 patent, it does not anticipate the '073 patent.

2. Obviousness

[11] Hale next argues that the '073 patent is invalid because it was obvious in light of the prior art. The issue of obviousness under 35 U.S.C. s. 103 is a question of law. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). The party alleging invalidity due to obviousness must show prior art references which alone or combined with other references would have rendered the invention obvious to one of ordinary skill in the art at the time of the invention. *Al- Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1323 (Fed.Cir.1999). In making this decision, the Court must determine the scope and content of the prior art, the differences between the prior art and the claimed subject matter, and the level of ordinary skill in the relevant field of endeavor. *Graham*, 383 U.S. at 18, 86 S.Ct. 684. The obviousness determination must involve more than an indiscriminate combination of the prior art; there must be some teaching, motivation, or suggestion in the prior art to make the specific combination that was made by the applicant. *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577 (Fed.Cir.1984). In determining obviousness, the invention must be considered as a whole without the benefit of hindsight. *Rockwell Int'l Corp. v. United States*, 147 F.3d 1358, 1364 (Fed.Cir.1998). "[T]he consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be

carried out and would have a reasonable likelihood of success." *Id.* at 1366 (citing *In re Dow Chem. Co.*, 837 F.2d 469, 473 (Fed.Cir.1988)).

Michigan Wheel argues that the prior art taught that a typical pitchometer included a structure identical to Ryan's claimed invention, in which the probe shaft remained in constant contact with the blade surface at a fixed radial distance from the center of rotation of the propeller, and which contained various mechanisms to measure the amount of angular movement of the probe. Although the use of encoders and electric logic circuits was not disclosed in the prior art, Michigan Wheel argues that encoders were well-known in other fields and were not novel *per se*. However, Ryan claimed during the prosecution of his patent that the application of encoders to the art of pitchometers was novel.

Michigan Wheel further argues that the differences between the Japanese publication and the '073 patent were so insubstantial as to permit one skilled in the art to find it obvious to substitute the optical encoders disclosed in the '073 patent for the conventional encoders disclosed in the Japanese publication. That may be so, but that does not account for the other differences between the '073 patent and the Japanese publication, including the roller on the probe tip to provide for constant contact with the blade surface, and the motor-driven or hand-cranked worm gear to rotate the spindle continuously as the measurements are being taken. Considering the invention as a whole, without the benefit of hindsight, and from the viewpoint of one skilled in the art of propeller blade pitch measurement, we find that none of the prior art references cited by Michigan Wheel suggest the combination of old and new elements specifically claimed in the '073 patent such that it would have been obvious at the time of the invention.

Because Michigan Wheel has failed to carry its burden of showing that the patent is invalid for anticipation, obviousness, or indefiniteness, we deny its motion for summary judgment of invalidity and hold that the '073 patent is valid and enforceable.

B. Patent Infringement

We turn our attention finally to Hale's motion for summary judgment of non-infringement. Determining whether an accused process or device infringes a patent claim is a two-step process. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1359 (Fed.Cir.2000). The Court first construes the claims at issue in order to ascertain the scope and meaning of the claims as a matter of law. *Id.* (citing *Streamfeeder, L.L.C. v. Sure-Feed Sys., Inc.*, 175 F.3d 974, 981 (Fed.Cir.1999)). The second step, reserved for the trier of fact, involves determining whether the claims as construed read on the accused device by comparing the accused device with the previously construed claims. *Id.*; *see also SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed.Cir.1985). In order to find infringement, the accused device must embody *every* limitation in the claim, either literally, or by a substantial equivalent. *Lantech, Inc. v. Keip Mach. Co.*, 32 F.3d 542, 547 (Fed.Cir.1994). Each limitation of the claim must be met by the accused device exactly and any deviation from the claim precludes a finding of literal infringement. *Id.*; *SRI Int'l*, 775 F.2d at 1121.

If comparison of a properly interpreted claim with a stipulated or uncontested description of an accused device reflects a complete absence of material fact issues, summary judgment is appropriate. *Amhil Enters. Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1557 (Fed.Cir.1996).

Ryan Marine's Sur-reply and Affidavits

[12] In its opposition to the motion, Ryan Marine denied Hale's factual statements describing its device but failed to point to any evidence in the record supporting its denials or showing that Hale's description of its

device is incorrect. After Hale argued in its reply brief that Ryan Marine had failed to introduce any countervailing evidence, Ryan Marine filed a sur-reply (with leave of the Court) and three affidavits in support. One of the affidavits, by George Mercier, fails to conform to the statutory standard for unsworn declarations set forth at 28 U.S.C. s. 1746, FN6 and therefore, we disregard it entirely. *See Nissho-Iwai Am. Corp. v. Kline*, 845 F.2d 1300, 1306-07 (5th Cir.1988).

FN6. The statute provides, in relevant part:

Wherever, under any law of the United States or under any rule, regulation, order, or requirement made pursuant to law, any matter is required or permitted to be supported, evidenced, established, or proved by the sworn declaration, verification, certificate, statement, oath, or affidavit, in writing of the person making the same (other than a deposition, or an oath of office, or an oath required to be taken before a specified official other than a notary public), such matter may, with like force and effect, be supported, evidenced, established, or proved by the unsworn declaration, certificate, verification, or statement, in writing of such person which is subscribed by him, as true under penalty of perjury, and dated, in substantially the following form:

.....

(2) If executed within the United States, its territories, possessions, or commonwealths: "I declare (or certify, verify, or state) under penalty of perjury that the foregoing is true and correct." Executed on (date).
(Signature)
28 U.S.C. s. 1746.

The affidavit by Larry Carlson, on the other hand, does contain the requisite language and may be considered competent. In his affidavit, Carlson claims to have viewed a Hale Propeller MRI displayed by Coastal Prop Technologies at the New Orleans International Boat Show on Dec. 7, 2000. He further claims that the device he viewed contained a spring-loaded ball bearing assembly at the tip of the probe shaft.

Hale objects to the late submission of the affidavit, produced months after the close of discovery. There is some support for the proposition that the Court need not consider such late-filed evidence, especially where "the record does not reflect that the evidentiary material was unavailable or unknown to [the party opposing the motion] at the time of its filing the original opposition to summary judgment." *See Mulberry Phosphates, Inc. v. City of Toledo*, 1997 WL 539860, at *3, 125 F.3d 856 (6th Cir. Aug. 29, 1997) (holding the district court did not abuse its discretion in refusing to consider affidavits filed with a sur-reply when "counsel offered absolutely no explanation for its failure to introduce the evidence earlier"). Here, Ryan Marine has offered no explanation for its late submission of evidence, despite having filed its corrected memorandum of law in opposition on the same day that the affidavit was executed. Nor does the affidavit support an issue discussed in the sur-reply in response to matters raised by the responsive brief. *See D. Conn. Loc. R. Civ. P. 9(g)* (A reply brief "must be strictly confined to a discussion of matters raised by the responsive brief"). We do not believe the Court's granting leave to file a sur-reply in such a complex patent dispute should be construed as an invitation to submit evidence that should properly have been filed with the opposition.

Hale further argues that, even if the statements are true, they do not create a genuine issue of material fact

regarding the probe tip made, used, or sold by Hale Propeller. Hale apparently argues that the device Carlson viewed could have been altered after manufacture and sale by Hale to add a roller or ball bearing to the probe tip assembly, and that none of Carlson's statements regarding the device he viewed are probative as to whether Hale makes, uses, or sells a device with a probe tip that rolls or rotates. Indeed, Hale argues, Ryan Marine's own expert, Norman Overway, inspected a Hale Propeller MRI device at a purchaser's place of business and testified that the probe tip did not roll or rotate. (Overway Dep. at 150-52.) Moreover, Carlson viewed the device on Dec. 7, 2000, months after the close of evidence in this case.

Taking into consideration all the misgivings we have concerning the relevance of this affidavit, we do not think we abuse our discretion in disregarding it.

1. Literal Infringement

An accused structure literally meets a section 112, paragraph 6 means-plus-function limitation if: (a) the accused structure is the same as the disclosed structure, or (b) it is an "equivalent thereof," i.e., the accused structure performs the identical function as the disclosed structure *and* it is otherwise insubstantially different with respect to structure. *Kemco Sales*, 208 F.3d at 1363. "Under a modified version of the function-way-result methodology ..., two structures may be 'equivalent' for purposes of section 112, paragraph 6 if they perform the identical function, in substantially the same way, with substantially the same result." *Kemco Sales*, 208 F.3d at 1363 (internal citation omitted); *see also* *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed.Cir.1999). Neither the Supreme Court nor the Federal Circuit has yet addressed the issue of whether the determination of equivalents under s. 112, paragraph 6 is a question of law or fact. *See* *Markman I*, 52 F.3d at 977 n. 8; *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1308 (Fed.Cir.1998).

Clause 1(b)

[13] Hale first argues that its device does not infringe Claim 1(b) because its device does not contain a roller at the end of the probe that contacts the blade surface. The issue we must determine is whether the accused device contains any structure on the tip of the probe shaft that is equivalent structure under s. 112, paragraph 6. Since we disregard the Carlson affidavit, Ryan Marine has submitted no testimony whatsoever showing that Hale made, sold, or used a device with a probe tip that rolls or rotates in any way. The issue, therefore, is whether the solid, pointed probe tip is equivalent structure under s. 112, paragraph 6 to the roller in the '073 patent. The test is whether the two structures perform the identical function, in substantially the same way, with substantially the same result. We find that the function the two structures perform is identical, *viz.*, maintaining the probe tip in constant contact with the blade surface by providing a low-friction means for the probe tip to move over the blade and eliminating chattering or skipping.

In analyzing whether the two structures perform that function in substantially the same way, we are guided by the Federal Circuit's decision in *Chiuminatta*, 145 F.3d at 1308. In that case, the Court found that the differences between wheels and a flat skid plate, which were used to slide over partially set concrete, were substantially different from each other and functioned in a substantially different way. The Court noted that the wheels rolled over the surface and were soft, compressible, round, and rotatable, while the skid plate was hard, flat, and, because it skidded over the surface, had a different impact on the concrete. *Id.* at 1309. The Court further noted the skid plate's potential gouging of the concrete and increased drag over the surface. *Id.*

Similarly, in this case, we are asked to compare two structures, a roller or wheel which glides or rolls over

the blade surface with minimal drag, and a solid conical probe tip. Even if the solid tip is somewhat blunted to prevent gouging, it undoubtedly skids over the blade surface with substantially more drag than a roller or wheel. Following *Chiuminatta*, we find that no reasonable jury could find the two structures to be equivalent.

Clause 1(c)

[14] Hale next argues that its device does not infringe because it does not contain a motor-driven or hand-cranked worm or gear drive. We agree. We must consider, however, whether there is equivalent structure in the accused device. Two structures are equivalent for purposes of section 112, paragraph 6 if they perform the identical function in substantially the same way with substantially the same result. In Hale's device, relative rotation is accomplished by actually grasping the edge of the propeller blade. The structure that permits such manual rotation is a rotatable turntable and a vertical spindle which holds the propeller. There is no corresponding structure that *provides* continuous relative rotation, in the sense that the motor-driven or hand-cranked worm drive supplies the power that rotates the turntable in the '073 patent. We find no correlation between the worm drive structure, which is a simple machine, and the direct manipulation of the propeller as a means for performing the recited function. Even if we were to find that the accused device contained corresponding structure which performed the identical function, no reasonable jury could find that the two structures perform the function in the same way, because of the inherent differences between a worm drive and direct manipulation of the propeller. Thus, we find as a matter of law that there is no equivalent structure in the accused device.

Having determined that this element is absent in the accused device, we find that the accused device does not infringe the '073 patent under the all elements rule, either literally, or by a substantial equivalent.FN7

FN7. Having so determined, we need not continue in our analysis of the other disputed claim limitations. We note, however, that the general purpose computer disclosed as an alternate means for performing the function in Clause 1(f) is met by the accused device. However, because the accused device does not meet all the claim limitations in Claim 1, it necessarily cannot meet all the claim limitations of dependent Claim 6.

2. Doctrine of Equivalents

[15] Even if an accused product differs enough from an asserted claim to preclude literal infringement, that product may infringe under the doctrine of equivalents if there is equivalence between those elements of the accused product and the claimed limitations of the patented invention that are not literally infringed. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997). Infringement lies under the doctrine only if an equivalent or a literal correspondence of every limitation of the claim is found in the accused device. *See id.* at 29, 117 S.Ct. 1040; *Zelinski v. Brunswick Corp.*, 185 F.3d 1311, 1316 (Fed.Cir.1999). Under the traditional tri-partite test, the accused structure must perform substantially the same function in substantially the same way to achieve substantially the same result. *Kemco Sales*, 208 F.3d at 1364. "[E]quivalence under the doctrine of equivalents requires that each claim limitation be met by an equivalent element in the accused device." *Chiuminatta*, 145 F.3d at 1308. Thus, "a finding of a lack of literal infringement for lack of equivalent structure under a means-plus-function limitation may preclude a finding of equivalence under the doctrine of equivalents." *Id.* at 1307-08. However, "[e]quivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum." *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609, 70 S.Ct. 854, 856-57, 94 L.Ed. 1097 (1950).

In this case, as in *Chiuminatta*, there can be no infringement under the doctrine of equivalents because the claim limitation specifying means for providing rotation is not met by an equivalent element in the accused device. Even if we assume the manual rotation permitted by the accused device to be equivalent structure, we have already determined that the function is not performed in substantially the same way. Thus, there can be no infringement under the doctrine of equivalents. Because no reasonable jury could find infringement, either literal or under the doctrine of equivalents, we grant Hale's motion for summary judgment of non-infringement.

CONCLUSION

For the reasons set forth above, the Court GRANTS Hale's motion for claims construction [**Doc. # 134**]. We GRANT Hale's motion for summary judgment of non-infringement [**Doc. # 131**], and we DENY Michigan Wheel's motion for summary judgment of patent invalidity [**Doc. # 130**].

SO ORDERED.

D.Conn.,2001.

Hale Propeller, L.L.C. v. Ryan Marine Products Pty., Ltd.

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