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United States Court of Appeals for the Federal Circuit

04-1116

DANA CORPORATION,

Plaintiff-Appellant,

v.

AMERICAN AXLE & MANUFACTURING, INC.,

Defendant-Appellee.

DECIDED: August 27, 2004

Before MICHEL, Circuit Judge, ARCHER, Senior Circuit Judge, and RADER, Circuit Judge.

MICHEL, Circuit Judge.

Plaintiff-Appellant Dana Corporation (“Dana”) appeals from an order granting summary judgment of non-infringement to American Axle & Manufacturing, Inc. (“AAM”) based on a finding that no reasonable jury could find that AAM’s accused products literally infringe the asserted claims of United States Patent Nos. 5,637,042 and 5,643,093 (“the ’042 patent” and “the ’093 patent,” respectively), and that Dana’s claim of infringement under the doctrine of equivalents was barred by prosecution history estoppel. Dana Corp. v. Am. Axle & Mfg., Inc., No. 98-74521 (E.D. Mich. Oct. 28, 2003) (“Summary Judgment Order”). Because we find that the district court erred in its construction of the disputed claim limitation, and thus in its finding of no literal infringement as a matter of law and erred in finding a prosecution history estoppel bar, we vacate the judgment of the district court and

remand the case for further proceedings consistent with this opinion.

BACKGROUND

Dana is the assignee of the patents-in-suit, which are directed to swaged vehicle driveshafts with a diameter reducing portion “having a substantially uniform wall thickness.” The invention of ’093 patent is described as:

A driveshaft includes a center portion having a larger diameter, an end portion having a reduced diameter, and a diameter reducing portion positioned between the center and end portions. The reduced diameter end portion of the driveshaft is secured to a reduced diameter tube yoke. This facilitates the introduction of tooling during assembly of a universal joint. The driveshaft is formed by a method which involves first heat treating the driveshaft to a relatively soft temper, then swaging the end portion of the driveshaft, and then heat treating the driveshaft again to a relatively hard temper. In more detail, a driveshaft is provided having a predetermined first diameter, the driveshaft being heat treated to achieve a relatively soft temper so as to possess a desired elongation factor. This allows the end portion of the driveshaft to be swaged to reduce the diameter thereof to a second predetermined diameter. After swaging, the driveshaft is heat treated again to achieve a relatively hard temper to meet the strength requirements for use.

’093 patent, Abstract. Claim 1 of the ’093 patent is as follows:

1. A drive line assembly comprising:

a driveshaft tube formed from a metallic material and including a homogeneous diameter reducing portion having a substantially uniform wall thickness, said diameter reducing portion including an axially extending cylindrical first end extending from said driveshaft tube, said diameter reducing portion further including an axially extending cylindrical second end, said axially extending cylindrical first end of said diameter reducing portion defining a first diameter, said axially extending cylindrical second end of said diameter reducing portion defining a second diameter, said first diameter being larger than said second diameter; and

a tube yoke formed from a metallic material and including an axially extending cylindrical end portion having a substantially uniform wall thickness which is co-axial with and permanently fixed to said axially extending cylindrical second end portion of said diameter reducing portion of said driveshaft tube, said tube yoke further including a pair of opposed lug ears extending from said end portion and having respective orifices formed therethrough.

'093 patent, claim 1 (emphases added).

Similarly, the invention of the '042 patent is described as:

A drive line assembly includes a cylindrically shaped driveshaft tube and a tube yoke, one end of the driveshaft tube fitting over the tube yoke in an interference fit sufficient to transfer torque between the driveshaft tube and the tube yoke, the tube yoke comprising a tube seat at one end for mating in a torque transferring relationship with the end of the driveshaft. The other end of the driveshaft tube yoke has a lug structure for transferring torque to other rotatable elements through a universal joint. The tube yoke has a diameter reducing portion intermediate the tube seat and the lug structure so that the lug structure is smaller in diameter than the drive shaft tube and the tube seat to facilitate the introduction of tooling to the lug structure during assembly operations of the universal joint.

'042 patent, Abstract. Claim 1 of the '042 patent is as follows:

1. A drive line assembly comprising:

a driveshaft tube formed from a metallic material and having a substantially uniform wall thickness, said driveshaft tube terminating in an axially extending cylindrical end portion;

a diameter reducing portion formed from a metallic material and having a substantially uniform wall thickness, said diameter reducing portion including an axially extending cylindrical first end which is co-axial with and permanently fixed to said axially extending cylindrical end portion of said driveshaft tube, said diameter reducing portion further including an axially extending cylindrical second end, said axially extending cylindrical first end of said diameter reducing portion defining a first diameter, said axially extending cylindrical second end of said diameter reducing portion defining a second diameter, said first diameter being larger than said second diameter; and

a tube yoke formed from a metallic material and including a pair of opposed lug ears having respective orifices formed therethrough, said tube yoke including an axially extending cylindrical end portion which is co-axial with and permanently fixed to said axially extending cylindrical second end of said diameter reducing portion for axial and rotational movement therewith.

'042 patent, claim 1 (emphases added). Independent claim 11 of the '042 patent is also directed to a driveline assembly "having a substantially uniform wall thickness." '042 patent at 6:1-3.

Dana sued AAM for the alleged infringement of claims 1-7 of the '093 patent and claims 1-19 of

the '042 patent. AAM moved for summary judgment of invalidity based on the pre-critical date activities of Dana and other companies. On September 1, 2000, the district court granted AAM's motions for summary judgment finding that all claims of both patents were invalid under section 102(b) based on independent pre-critical date activities of General Motors and Dana, stating that "the only claim at issue is whether the diameter of the reducing portion of the swaged ends has a 'substantially uniform wall thickness.'" The district court denied AAM's motion for summary judgment of unenforceability.

Dana appealed to this court, which vacated summary judgment and remanded to the district court. Dana Corp. v. American Axle & Mfg., Inc., 279 F.3d 1372 (Fed. Cir. 2002). This court concluded that the district court had erred in failing to construe and apply the "substantially uniform wall thickness" limitation before granting summary judgment of invalidity, vacated the entry of summary judgment, and remanded the case to the district court for further proceedings. Id. at 1377.

On remand, the district court held a claim construction hearing. On March 3, 2003, the district court issued an Order Regarding Claim Interpretation, construing three claim limitations, namely, "substantially uniform wall thickness," "diameter reducing portion," and "about five inches." Dana Corp. v. Am. Axle & Mfg., Inc., No. 98-74521 (E.D. Mich. Mar. 3, 2003) ("Order Regarding Claim Interpretation"). The court interpreted the term "substantially uniform wall thickness" to mean "a wall thickness that does not vary more than the wall variation in the tube wall before swaging." Id. at 2. More specifically, the court wrote:

During prosecution of the patent applications, plaintiff Dana amended the claims by addition of the term "substantially uniform wall thickness" in the diameter reducing portion. There is no textual description or discussion of this claim element in the specification of the patents. The only reference pointed to by Dana is the drawings, which show the wall thickness designated by parallel lines, i.e., equal thickness throughout. This would be the common meaning of the term. Since no other meaning is specifically given or pointed to in the specification, the common meaning should be used.

Likewise, in the Petition to Make Special for the '093 patents, Dana characterized the prior art where a tube is swaged on a mandrel to control the inner diameter as having substantially uniform wall thickness. See

Gentry Gallery, Inc. v. Berkline Corp., 134 F.3d 1473, 1477 (Fed. Cir. 1998). This is contrasted to an uncontrolled inner diameter produced by normal swaging, which was non-uniform wall thickness. This limitation was subsequently added to the claims to overcome prior art rejections based on normally [s]waged shafts.

Therefore, the court interprets the phrase “substantially uniform wall thickness” as used in the patents as meaning a wall thickness that does not vary more than the wall variation in the tube wall before swaging.

Id. at 1-2.

On October 29, 2003, the district court granted AAM’s motion for summary judgment of noninfringement, based solely on the “substantially uniform wall thickness” claim limitation. Specifically, the court held that, even accepting Dana’s contention as to how much variation in wall thickness constitutes the manufacturing tolerance, “the wall thickness in the swaged portion of the accused device varies more than the wall thickness before swaging.” Summary Judgment Order at 4. Therefore, the district court found, “[s]ince a claim element is absent from the accused product, there is no literal infringement.” Id. With regard to infringement under the doctrine of equivalents, the district court found that because the “substantially uniform wall thickness” limitation was added to the claims to overcome prior art rejections based on normally swaged shafts, prosecution history estoppel applied and the doctrine of equivalents was not available to Dana. Id. at 5-6. The district court entered judgment in favor of AAM on November 6, 2003.

Dana timely appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

This opinion follows the court’s review of the record and briefs, and consideration of the parties’ oral argument, heard on August 4, 2004.

DISCUSSION

We review de novo a district court’s grant of summary judgment. Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 149 F.3d 1309, 1315 (Fed. Cir. 1998). Summary judgment is appropriate if, drawing all factual inferences in favor of the non-movant, he cannot show there is a genuine issue of material fact and the movant is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255 (1986).

Analysis of infringement involves two steps. Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d 985, 988 (Fed. Cir. 1999). First, the trial court determines the scope and meaning of the asserted claims. Markman v. Westview Instruments, Inc., 517 U.S. 370, 372-74 (1996). The trial court's claim construction is an issue of law reviewed without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc). Second, the claims as construed by the court are compared limitation by limitation to the features of the allegedly infringing device. Johnson Worldwide, 175 F.3d at 988. We affirm a district court's grant of summary judgment of non-infringement only if, "after viewing the alleged facts in the light most favorable to the non-movant, there is no genuine issue whether the accused device is encompassed by the claims." Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1304 (Fed. Cir. 1999).

On appeal, Dana challenges both the claim construction ordered by the district court and the resultant grant of summary judgment of non-infringement. We address these challenges below.

I.

The language of the claim defines the boundary of its scope. Teleflex, Inc. v. Ficoso N. Am. Corp., 299 F.3d 1313, 1324 (Fed. Cir. 2002). Accordingly, "the claim construction inquiry . . . begins and ends in all cases with the actual words of the claim." Id. (quoting Renishaw plc v. Marposs Societa' per Azioni, 158 F.3d 1243, 1248 (Fed. Cir. 1998)). Claim terms must be construed as they would be understood by a person of ordinary skill in the art to which the invention pertains. Specialty Composites v. Cabot Corp., 845 F.2d 981, 986 (Fed. Cir. 1988). What the claim terms would mean to laymen is irrelevant. "The words used in the claim[] are interpreted in light of the intrinsic evidence of record, including the written description, the drawings, and the prosecution history, if in evidence." Teleflex, 299 F.3d at 1324.

Here, we agree with Dana that the district court erred in construing the limitation "substantially uniform wall thickness" to mean a "wall thickness that does not vary more than the wall variation in the tube wall before swaging." We hold that "substantially uniform wall thickness" is properly construed to mean that the wall of the tube is largely or approximately uniform in thickness, but may vary at least as

much as the wall thickness varied prior to swaging plus the variation in wall thickness that necessarily results from swaging the tube in accordance with the claimed invention of the '093 and '042 patents.

Looking first to the claim language itself, we are persuaded by Dana's argument that the limitation "substantially uniform wall thickness" must allow for variation in wall thickness greater than the pre-swaging variation in order to give meaning to the term "substantially." The pre-swaging manufacturing tolerance is a manufacturing reality that would have to be encompassed within the claim even if the modifier "substantially" was not used; otherwise, no real-world embodiment, including the patentee's own embodiment, could fall within the scope of the claim. The use of the modifier "substantially" signals that the claim drafter intended the scope of the claims of the patents-in-suit to allow for some variation greater than that variation that necessarily exists in any driveshaft claims due to simple manufacturing realities.

The term "substantially" is commonly used by claim drafters to indicate approximation. See Cordis Corp. v. Medtronic AVE Inc., 339 F.3d 1352, 1360 (Fed. Cir. 2003) ("The patents do not set out any numerical standard by which to determine whether the thickness of the wall surface is 'substantially uniform.' The term 'substantially,' as used in this context, denotes approximation. Thus, the walls must be of largely or approximately uniform thickness."); see also Deering Precision Instruments, LLC v. Vector Distribution Sys., Inc., 347 F.3d 1314, 1322 (Fed. Cir. 2003) ("Indeed, our cases recognize the dual ordinary meaning of this term as connoting a term of approximation or a term of magnitude."); Epcon Gas Sys., Inc. v. Bauer Compressors, Inc., 279 F.3d 1022, 1031 (Fed. Cir. 2002). We find that the term "substantially" was used in just such a manner in the claims of the patents-in-suit: "substantially uniform wall thickness" denotes a wall thickness with approximate uniformity.

Nothing in the specification confirms or conflicts with this construction. Indeed, the district court found, and the parties agree, that the written descriptions of the '093 and '042 patent are not helpful in construction of the disputed limitation because neither written description addresses wall thickness of the driveshaft tube, and the '042 patent's written description does not even describe the

swaging process. We agree. With regard to the drawings in the patents-in-suit, we are persuaded by Dana's argument that the district court erred in relying on these drawings to limit the scope of the claims to only pre-swaging wall thickness variations. That the drawings of the patents delineate walls with parallel lines does not require that the claims be limited to tubes with wall thicknesses that are perfectly uniform except for pre-swaging manufacturing tolerances: the reduced size of the drawings (which are not drawn to scale to begin with) makes variation in wall thickness imperceptible. Moreover, even if the drawings were a reliable indicator of wall thickness variations in particular embodiments, that alone would not warrant limiting the claims to the wall thickness variation depicted therein.

We next turn to the prosecution histories of the patents-in-suit for guidance as to the construction of the limitation "substantially uniform wall thickness." As noted above, the district court found that, in the Petition to Make Special for the '093 patent, Dana characterized the prior art where a tube is swaged on a mandrel to control the inner diameter as having substantially uniform wall thickness, in contrast to an uncontrolled inner diameter produced by normal swaging, which was a non-uniform wall thickness. Order Regarding Claim Interpretation at 2. Accordingly, the district court found that the "substantially uniform wall thickness" limitation was added to the claims to overcome prior art rejections based on normally swaged shafts (i.e., shafts swaged without an inner mandrel). *Id.* We disagree with the district court's interpretation of the prosecution history.

In the Petition to Make Special, the patentee argued:

U.S. Patent No. 3,854,316 to Wilson discloses a method of forming a hollow aluminum baseball bat having a substantially uniform thickness. Initially, a hollow cylindrical tube blank is extruded or drawn so as to have a constant diameter and thickness. Then, a longitudinal portion of the tube is placed on a mandrel having a constant outer diameter which corresponds to the inner diameter of the handle portion of the bat to be formed. Next, the handle portion of the tube is reduced, such as by swaging, to provide reduced outer and inner diameters and a substantially uniform thickness. During this reduction step, the longitudinal relationship between the tube and the mandrel is maintained. . . . U.S. Patent No. 3,479,030 to Merola discloses a similar method. These patents clearly relate to a non-analogous field of art (baseball bats) relative to the claimed invention (driveshaft tubes for vehicles) and would not have been considered by a person having ordinary skill in the art.

We do not agree with the district court that this language constitutes a distinction between a shaft swaged with an inner mandrel (substantially uniform) and a shaft swaged without an inner mandrel (non-uniform). Indeed, the patentee characterized the entire bat as having a substantially uniform wall thickness. This is fully consistent with the Wilson reference itself, which teaches “[a] method of making a hollow metal ball bat having a wall thickness along the length thereof that is substantially uniform,” regardless of whether the longitudinal portion was swaged with an inner mandrel. See U.S. Patent No. 3,854,316, Abstract (emphasis added). In addition, the remarks accompanying the patentee’s amendment to the claims adding the disputed limitation indicate that the patentee sought to distinguish the patented invention on the grounds that the Shinohara reference cited by the examiner did “not disclose a driveshaft tube having a substantially uniform wall thickness throughout the central portion and the end portion.” Thus, we cannot agree with the district court that the “substantially uniform wall thickness” limitation was added to distinguish normally-swaged shafts from shafts swaged with a mandrel.

Because the patent specification and prosecution history provide no specific numerical guidance as to the range encompassed by the term “substantially,” and because we do not find convincing the scant expert testimony cited by the parties, we do not construe the limitation “substantially uniform wall thickness” as having any specific numerical range. Instead, we hold that “substantially uniform wall thickness” is properly construed to mean that the wall of the tube is largely or approximately uniform in thickness, but may vary at least as much as the wall thickness varied prior to swaging plus the variation in wall thickness that necessarily results from swaging a portion of the tube in accordance with the claimed invention of the ’093 and ’042 patents.

II.

Because the district court’s grant of summary judgment of no literal infringement was premised on its incorrect construction of the disputed limitation, we must vacate the entry of summary judgment. Though our revised construction does not set forth a numerical range of permissible wall thickness variation, this construction should not be taken as precluding the entry of summary judgment of infringement or non-infringement by the district court in its further proceedings. If the district court

finds either infringement or non-infringement as a matter of law (i.e., if the district court finds that no reasonable jury could find that the accused products do not infringe or fail to find they do infringe, respectively) under the correct construction, the entry of summary judgment would be appropriate. Otherwise, a trial on infringement is appropriate.

With regard to the entry of summary judgment of non-infringement under the doctrine of equivalents based on a conclusion of prosecution history estoppel, we must also vacate and remand to the district court. Because, as noted above, the district court erred in holding that the “substantially uniform wall thickness” limitation was added to overcome prior art references teaching normally swaged shafts, its resultant finding of prosecution history estoppel must be vacated.

CONCLUSION

We hold that the district court erred in its construction of the disputed claim term “substantially uniform wall thickness” in the '093 and '042 patents. Because the district court’s entry of summary judgment of non-infringement was premised upon an incorrect construction of this limitation, the order granting summary judgment is in all respects

VACATED AND REMANDED.