United States Court of Appeals for the Federal Circuit

00-1163

ACROMED CORPORATION,

Plaintiff-Appellee,

v.

SOFAMOR DANEK GROUP, INC. and DANEK MEDICAL, INC.,

Defendants-Appellants.

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Robert C. Kahrl, Jones, Day, Reavis & Pogue, of Cleveland, Ohio, argued for plaintiff-appellee. With him on the brief were Calvin P. Griffith, Richard H. Sayler, Michael L. Snyder, Patrick J. Norton, and Deborah L. Hamilton.

Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., of Washington, DC, argued for defendants-appellants. With him on the brief were Thomas H. Jenkins, of Washington, DC, and Barry D. Biddle, of Atlanta, Georgia.

Appealed from: United States District Court for the Northern District of Ohio

Senior Judge Ann Aldrich

United States Court of Appeals for the Federal Circuit

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ACROMED CORPORATION,

Plaintiff-Appellee,

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SOFAMOR DANEK GROUP, INC. and DANEK MEDICAL, INC.,

Defendants- Appellants.

DECIDED: June 8, 2001

Before MICHEL, RADER, and LINN, Circuit Judges.

RADER, Circuit Judge.

At the close of evidence, the United States District Court for the Northern District of Ohio granted judgment as a matter of law (JMOL) that AcroMed Corporation's (AcroMed's) U.S. Patent No. 4,696,290 ('290 patent) is not invalid for improper inventorship. The jury's verdict found that Sofamor Danek Group, Inc., and Danek Medical, Inc., (collectively Danek) literally infringed the claims of the '290 patent and AcroMed's U.S. Patent No. 4,854,311 ('311 patent). The jury further found the claims of the '311 patent not invalid. Because the district court correctly found insufficient evidence to invalidate the '290 patent and correctly upheld the jury verdict that the claims of the '311 patent were infringed and not invalid, this court affirms.

I

AcroMed is assignee of the '290 patent which names Dr. Arthur D. Steffee as its sole inventor. The '290 patent discloses a plate for surgical implantation onto a patient's spinal column. The spine plate straightens a spine misshapen by disc degeneration or fracture. This invention can thus alleviate pain and restore a patient's mobility.

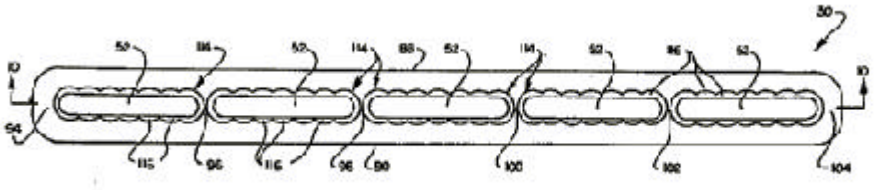
In his first spine straightening operations, Dr. Steffee hooked and wired rods to patients' spines. This early method straightened spines somewhat, but the rods would later slip, thereby undercutting the effectiveness of the operation. To prevent slippage, Dr. Steffee began to use a plate-and-screw system similar to that described in the '290 patent.

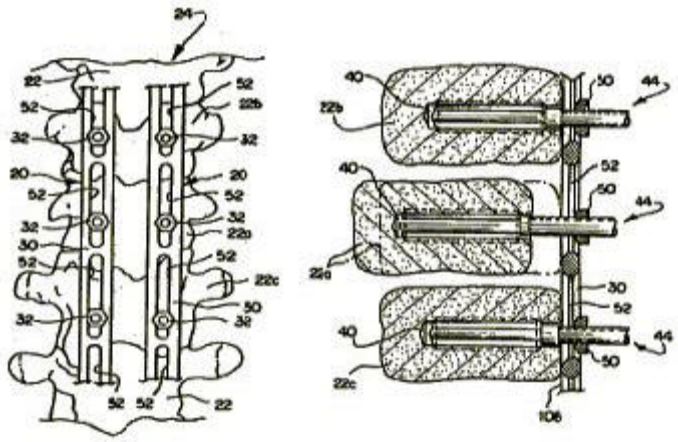
Dr. Steffee's first plate-and-screw system used a long plate with fixed location screw holes. Dr.

Steffee implanted this type of plate-and-screw system by drilling or tapping holes into a patient's vertebrae, aligning the vertebral holes with holes in the plate, and then attaching the plate with bone screws. Dr. Steffee typically installed two such plates, one on each side of the spine. These systems fixed the vertebrae more rigidly than wire and rod systems. The plates with holes in fixed locations, however, were difficult to install and adapt to different patients because the holes were rarely spaced identically to pedicle distances between a patient's vertebrae.

Dr. Steffee thus improved his plate-and-screw system in 1982 while working at a hospital in Cleveland. He conceived of headless screws that would permit him to first optimally locate such screws in each vertebral pedicle, and then attach the spine plate to the installed screws. Dr. Steffee took his regular bone screws to the Cleveland Research Institute (CRI) hospital machine shop, and asked Frank Janson, a machinist, to cut the heads off of the screws. Without screw heads, Dr. Steffee needed to find another means to attach the plate to the screws in the spine. He conceived of using a tapered, conical nut from a Hagie pin, a pin commonly used by orthopedists to fix broken hips in children.

Next, Dr. Steffee recognized that he would need to modify the fixed location screw holes in the plate to facilitate attachment at different pedical distances between vertebrae. Dr. Steffee looked to another well-known device—a small, slotted Egger's plate which orthopedic surgeons use to fix long bone fractures. Dr. Steffee asked Mr. Janson to make a bigger Egger's plate to accommodate a spine.





Dr. Steffee's final problem was that the slots in the plate could slide along the screws and defeat proper fixation of the plate to the spine. To solve this problem, Dr. Steffee told Mr. Janson that he needed a plate designed so that the Hagie pin nut "sinks in and stays right there." Mr. Janson responded to this instruction by putting nests in the slots. The '290 patent claims the resulting combination.

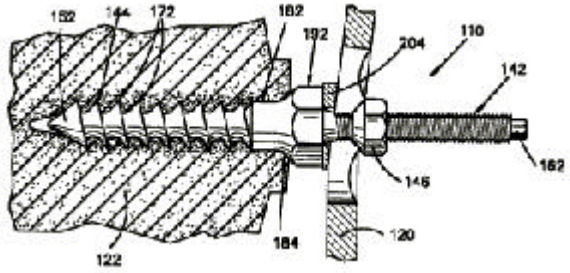
The disclosed spine plate (30) has a series of elongated slots (52) configured with a series of nests, or arcuate recesses (116). Claim 1 of the '290 patent recites:

> An apparatus for use with fasteners for maintaining vertebrae in a desired relationship, said apparatus comprising:
>
> an elongated plate for connecting at least two vertebrae . . .
>
> said elongated plate also having at least one elongated slot extending therethrough . . . said slot being capable of receiving a fastener therein . . . and
>
> said slot being defined by opposed slot surfaces extending longitudinally of said elongated plate and arcuate recesses in said opposed slot surfaces and spaced therealong, the recesses in one of said opposed slot surfaces being aligned with the recesses in the other of said opposed slot surfaces to define said plurality of locations, said recesses comprising means for blocking sliding movement of [s]aid elongated plate relative to the fastener and of said elongated plate relative to the vertebrae when the fastener is located in a pair of aligned recesses

(emphasis added).

Dr. Steffee also improved the headless bone screw. The '311 patent discloses a bone screw with an elongated shank to, e.g., fasten the plate of the '290 patent to a spine, connect broken bones, or connect prostheses to bones in any part of the body. The '311 patent describes the bone

screw as having three identifiable segments: (1) a first externally threaded portion (142) for receiving a connecting member, such as a nut; (2) a cylindrical body portion for projecting into and engaging the bone opening surface (182); and (3) a second threaded portion for attaching the screw to the bone (144).



Bones have a hard outer shell (called cortical bone) and a spongy center (called cancellous bone). Cancellous bone contains blood vessels. Thus, once a hole is drilled or tapped into a bone, effluence (blood and other bodily fluids) may leak into the hole. This effluence can corrode and weaken the screw. According to the '311 patent, the claimed bone screw has a cylindrical body portion and a shoulder portion (184) that act as a sort of stopper, blocking effluence from leaking out of the bone. Claim 5 of the '311 patent recites:

> A bone screw for connecting a bone portion with a bone connecting member, said bone screw comprising:
>
> an elongated shank having a longitudinal central axis, a first externally threaded portion for receiving an internally threaded nut and a second externally threaded portion for threaded engagement with a surface defining an opening in the bone portion to attach the bone screw to the bone portion; and
>
> means integral with said shank and having a transverse cross-section at least equal to the transverse cross-section of the opening in the bone portion for projecting into the opening and for engaging a portion of the surface defining the opening in the bone portion to restrict movement of said bone screw relative to the bone portion in a direction transverse to the longitudinal central axis of said shank and to block effluence from the opening in the bone portion, said means being located intermediate said first externally threaded portion and said second externally threaded portion

(emphasis added).

Dr. Steffee and another colleague founded AcroMed in 1983. Dr. Steffee assigned all of his rights in the '290 and '311 patents to AcroMed. In 1988, CRI disbanded and Mr. Janson went to work at

AcroMed. When Mr. Janson began working for AcroMed, he completed an Employment Agreement requiring him to disclose any pre-existing invention in which he had an interest. Mr. Janson checked the box marked "Employee has no such property," and signed that agreement.

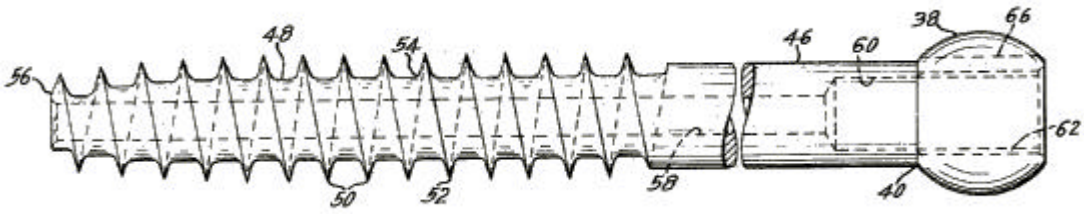
Mr. Janson worked as a machinist at AcroMed until 1992, and then continued as a consultant for AcroMed until June 1994. In June 1994, Mr. Janson met with Danek's counsel on two occasions. Later that year AcroMed requested Mr. Janson to sign a declaration and power of attorney to add him as a co-inventor of the '290 patent. AcroMed also requested Mr. Janson to assign his rights in the '290 patent if he signed the declaration. Mr. Janson declined to sign either the declaration or the assignment. Instead, on January 25, 1995, Mr. Janson signed an agreement with Danek to assign his "patent rights" to Danek for $150,000.

AcroMed first sued Danek for infringement of the '290 patent by Danek's "Luque" system in 1988. The Luque was a semi-constrained plate-and-screw system without a way to hold the screws completely rigid to the plate. In March 1989, the parties entered a settlement agreement whereby AcroMed granted Danek a limited license under the '290 patent. In return, Danek paid AcroMed a license fee until 1996.

In 1992, Danek changed its technology into a constrained system. Danek developed several constrained systems, including the "DYNA-LOK" and "Z-PLATE" systems. In June 1993, AcroMed again filed suit claiming that Danek's DYNA-LOK, Z-PLATE, and various other spine plate systems infringe the '311 and '290 patents. Danek counterclaimed that AcroMed's '290 patent is invalid for failure to name Mr. Janson as an inventor. Danek further counterclaimed that AcroMed's '311 patent is invalid due to anticipation by United States Patent No. 3,554,193 to Ilias Konstantinou (Konstantinou patent).

As depicted below, the Konstantinou patent discloses a hip-pinning device for repair of hip fractures. The device uses a lag screw to attach a bone plate to the upper region of a femur.

The lag screw has a rounded head portion (38) that permits the screw to be angularly displaced within a hole in a bone plate. A surgeon can, thus, vary the angle at which he attaches the screw to the bone while maintaining the plate in a desired location.



After a ten-day jury trial, the district court judge granted AcroMed's motion for JMOL that the '290 patent was not invalid for improper inventorship. The jury returned a verdict that Danek's DYNA-LOK and Z-PLATE spine plates infringed the asserted claims of the '290 patent. The jury further found that Danek's DYNA-LOK and Z-PLATE 5.5 mm bone bolts infringed claims 5, 10, 14, and 16 of the '311 patent and that Danek's DYNA-LOK and Z-PLATE larger diameter bone bolts infringed claims 5, 10, 12, 13, 14, and 16. The jury additionally found all asserted claims of both the '290 and '311 patent to be neither anticipated nor obvious over prior art. The jury awarded AcroMed $32,913,444 in damages and found that Danek had willfully infringed the '290 patent.

After the jury verdict, Danek renewed its motions for JMOL that the '290 patent is invalid for omitting an inventor, that its spine plates and screws do not infringe the '311 patent, and that the Konstantinou patent anticipates the '311 patent. The district court denied all of these motions. The district court then increased the damages to $47,806,701 to account for post-verdict damages and prejudgment interest. Danek appealed. This court has jurisdiction under 28 U.S.C. § 1295(a)(1).

II.

Inventorship is a question of law that this court reviews without deference. Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460, 45 USPQ2d 1545, 1547 (Fed. Cir. 1998). A district court may only grant a motion for JMOL when "a party has been fully heard on [that] issue and there is no

legally sufficient evidentiary basis for a reasonable jury to find for that party." Fed. R. Civ. P. 50(a)(1). This court reviews a district court's decision on a motion for JMOL without deference, reapplying the above standard. Burroughs Wellcome Co. v. Barr Lab., Inc., 40 F.3d 1223, 1227, 32 USPQ2d 1915, 1919 (Fed. Cir. 1994).

Literal infringement of a means-plus-function claim requires, inter alia, a showing that the accused device "performs the identical function specified in the claims." WMS Gaming Inc. v. Int'l Game Tech., 184 F.3d 1339, 1350, 51 USPQ2d 1385, 1393 (Fed. Cir. 1999). Determination of the "specific function associated with the means limitation requires construction of the claim language." Unidynamics Corp. v. Automatic Prods. Int'l Ltd., 157 F.3d 1311, 1319, 48 USPQ2d 1099, 1105 (Fed. Cir. 1998). This court reviews claim construction without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1454, 46 USPQ2d 1169, 1172 (Fed. Cir. 1998) (en banc). Application of the claim to the accused device is a question of fact that receives substantial deference on review. Embrex, Inc. v. Serv. Eng'g Corp., 216 F.3d 1343, 1348-49, 55 USPQ2d 1161, 1164 (Fed. Cir. 2000).

Anticipation is also a factual determination, including whether or not an element is inherent in the prior art. Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 619, 225 USPQ 634, 637 (Fed. Cir. 1985). This court reviews a jury finding of anticipation for substantial evidence. Advanced Display Sys. v. Kent State Univ., 212 F.3d 1272, 1281, 54 USPQ2d 1673, 1678 (Fed. Cir. 2000).

Inventorship

The Patent Act accords each patent a presumption of validity. 35 U.S.C. § 282. Under this doctrine, each patent also receives the presumption that its named inventors are the true and only inventors. Hess v. Advanced Cardiovascular Sys., Inc., 106 F.3d 976, 980, 41 USPQ2d 1782, 1785-86 (Fed. Cir. 1997). In order to rebut this presumption, a party challenging patent validity

for omission of an inventor must present clear and convincing evidence that the omitted individual actually invented the claimed invention. Environ Prods. v. Furon Co., 215 F.3d 1261, 1265, 55 USPQ2d 1038, 1042 (Fed. Cir. 2000).

When an invention is the work of several inventors, they must jointly apply for the patent. 35 U.S.C. § 116; 35 U.S.C. § 111. Omission of an inventor can invalidate a patent unless the omission was an error "without any deceptive intention." 35 U.S.C. § 256; 35 U.S.C. § 102(f); Stark v. Advanced Magnetics, 119 F.3d 1551, 1553, 43 USPQ2d 1321, 1322 (Fed. Cir. 1997). Danek argues that Mr. Janson was an inventor of the '290 patent. Because Mr. Janson was not named as an inventor of the '290 patent, Danek asserts that a reasonable jury would have found the '290 patent invalid.

"Inventorship is a question of who actually invented the subject matter claimed in a patent." Sewall v. Walters, 21 F.3d 411, 417, 30 USPQ2d 1356, 1360 (Fed. Cir. 1994) (quoting Beech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248, 26 USPQ2d 1572, 1582 (Fed. Cir. 1993)). "Conception is the touchstone of inventorship." Burroughs Wellcome, 40 F.3d at 1227. Accordingly, each person claiming to be a joint inventor must have contributed to the conception of the invention. Fina Oil & Chem. Co. v. Ewen, 123 F.3d 1466, 1473, 43 USPQ2d 1935, 1942 (Fed. Cir. 1997). To prove that contribution, the purported inventor must "provide corroborating evidence of any asserted contributions to the conception." Id. at 1474; see Price v. Symsek, 988 F.2d 1187, 1194, 26 USPQ2d 1031, 1036 (Fed. Cir. 1993) ("[T]he case law is unequivocal that an inventor's testimony respecting the facts surrounding a claim of derivation or priority of invention cannot, standing alone, rise to the level of clear and convincing proof."). Beyond conception, a purported inventor must show that he made "a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and [did] more than merely explain to the real inventors well-known concepts and/or the current state of the art." Pannu v. Iolab Corp., 155 F.3d 1344, 1351, 47 USPQ2d 1657, 1663 (Fed.

Cir. 1998).

Danek asserts that Mr. Janson conceived the arcuate recesses recited in claim 1 of the '290 patent. Danek argues that Mr. Janson's testimony that he invented the arcuate recesses and the conical nut is sufficient evidence of conception and contribution. The record, however, contains no evidence to corroborate this assertion.

Mr. Janson testified that he conceived of a conical nut and arcuate recesses to prevent sliding movement of a spine plate before Dr. Steffee ever mentioned problems with plate sliding. Mr. Janson further testified that he was the first to conceive of a spine plate with slots and the first to conceive of transforming regular bone screws into machine-threaded screws to accept a slotted plate. In other words, according to Mr. Janson, he conceived of the entire plate-and-screw combination. Danek, however, was not able to put forth other witnesses, dated drawings, or any other evidence to verify Mr. Janson's assertions. In fact, Mr. Janson himself admitted that he did not communicate his conceptions to anyone.

On appeal, Danek argues that Dr. Steffee's own testimony corroborates Mr. Janson's claims of conceiving the arcuate recesses. In particular, Danek quotes the following deposition testimony made by Dr. Steffee:

> I have always said Frank Jansen [sic] was the one who put the nests in the slots, that's the only thing that Frank Jansen [sic] did. And I was right there when he asked me if he could do it.
> . . .
> He and I were standing there together, he asked me if he could put the drill press down and put those nest in, and I said, fine, it sounds like a good idea, let's do it.

AcroMed concedes that Mr. Janson cut the arcuate recesses into the spine plate. Countersinking the slots in the spine plate, however, was not an inventive conception. The record in context supports the district court's conclusion that Dr. Steffee alone conceived the invention. Specifically, Dr. Steffee testified that when he brought the slotted plate and conical nut to Mr. Janson, he explained: "When I drive the nut down, I have to have it so it sinks in and stays right

there." Dr. Steffee thus instructed Mr. Janson to design the plate according to his conception. Mr. Janson's work of putting arcuate recesses in the slots "was simply the exercise of the normal skill expected of an ordinary" machinist. Sewall, 21 F.3d at 416. Danek, having had the burden of proof at trial, did not present adequate evidence to suggest otherwise. As explained by the district court: "Danek could have countered this by producing testimony at trial concerning what would or would not be obvious to one ordinarily skilled in the art of making plates. Danek never did."

Danek argues that the prosecution history of the '290 patent provides clear and convincing evidence that the arcuate recesses were an inventive conception. During prosecution of the '290 patent at the United States Patent and Trademark Office, the patent examiner rejected claim 1 as obvious over prior art. In its response, AcroMed explained that the prior art did not "disclose or suggest an elongated plate with an elongated slot therein having arcuate recesses in the slot." AcroMed further explained that the prior art plates actually permitted sliding movement instead of the "blocking" it as recited in claim 1. Contrary to Danek's contentions, AcroMed did not assert that the arcuate recesses alone rendered claim 1 patentable. Rather, AcroMed observed that the combination of an elongated plate with slots having arcuate recesses blocked sliding movements.

Danek further argues that the arcuate recesses are the sole feature that makes claim 1 patentable over prior art cited during trial to invalidate the '290 patent for obviousness. These prior art references, however, do not provide substantial evidence that Mr. Janson's countersinking of the elongated slots was more than the work of an ordinarily skilled machinist following instructions.

Claim 1 of the '290 patent is a combination claim. This court has long established that "[c]ombination claims can consist of new combinations of old elements . . . for it may be that the combination of the old elements is novel and patentable." Clearstream Wastewater Sys. v. Hydro-Action, Inc., 206 F.3d 1440, 1444, 54 USPQ2d 1185, 1189 (Fed. Cir. 2000); Intel Corp. v. U.S. Int'l Trade Comm., 946 F.2d 821, 842, 20 USPQ2d 1161, 1179 (Fed. Cir. 1991) ("That all

elements of an invention may have been old . . . is however, simply irrelevant. Virtually all inventions are combinations and virtually all are combinations of old elements."). In fact, all of the elements in claim 1 appear in the prior art. For example, the '290 spine plate was modeled after the Egger's plate, a plate with elongated slots. A patent cited by Danek, Great Britain Patent No. 780,652, discloses plates for spinal fixation that are designed to prevent relative movement between fastening bolts and the plates. In fact, United States Patent No. 3,596,656 cited by the examiner during prosecution shows that arcuate recesses, or countersinking around a hole in a plate, appeared in prior art as early as the 1960s. Claim 1, however, combined these various old features to produce a new and nonobvious invention. The entire combination, not the arcuate recesses alone, renders claim 1 patentable.

Without corroborating evidence, Danek did not present clear and convincing evidence at trial that Mr. Janson's countersinking of the elongated slots was an inventive conception. Thus, the record contains sufficient evidence to support the judgment that the '290 patent withstood challenges to its validity based on excluding Mr. Janson as an inventor.

Infringement

The district court interpreted claim 5 of the '311 patent as a means-plus-function claim. The district court next construed the "means integral" as the body portion and tapering shoulder portion of the screw. The trial court then defined "engaging" as "fitting together." Danek argues that the district court's claim construction is incorrect and that under the correct claim construction, four of the five allegedly infringing screws do not infringe.

Danek asserts that "engaging" requires the narrow construction that the body portion of the screw forces cancellous bone tissue forward and radially outward into the thread space left behind by the screw thread or the tap. According to Danek, its four screws with a thread diameter larger than 5.5 mm cannot push bone with their body portions during insertion because this screw

thread diameter is larger than the diameter of the screw body portion. Danek's expert, Dr. Pope, testified that these screws would not "ram in" and "displace material upwards and outwards" as described in the '311 patent.

The word "engage" means "to interlock" or "mesh." Webster's II New Riverside University Dictionary 433 (1988). This meaning matches the district court's construction that "engage" means to "fit together." The written description of the '311 patent does not depart from or narrow this meaning. The '311 patent uses "engage" to define three interfaces: (1) threaded engagement of the screw threads with the bone opening "to attach the bone screw to the bone," col. 2, ll.1 68-69; claims 1, 5, 10, 15 and 16; (2) engagement of the body portion with a portion of the surface defining the bone opening "to restrict movement of the bone screw" and to block "fluid flow from the opening of the bone," col. 3, ll. 8-12; claims 4, 5, 15 and 16; and (3) engagement of the seat portion (top plane of the screw's body portion) with the connecting member (e.g., the spine plate) "to establish the axial location of the connecting member along the bone screw," col. 3, ll. 19-21; claims 14 and 16. These three uses of the term require a meaning broad enough to apply to each of these interfaces. Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1345 (Fed. Cir. 1998) ("[T]he same word appearing in the same claim should be interpreted consistently."); Fonar Corp. v. Johnson & Johnson, 821 F.2d 627, 632, 3 USPQ2d 1109, 1113 (Fed. Cir. 1987) (holding that the meaning of a term in a claim must be consistent with its appearance in other claims in the same patent).

Contrary to Danek's assertion, "engage" cannot mean only "to push material forward and outward." In engaging a connecting member, one of the uses of the term, the seat portion of the screw does not push any part of the connecting member forward and outward. Accordingly, the interpretation "fitting together" best accommodates the various usages of the term in the patent. Thus, the seat portion of the screw has a flat surface that "fits together" with a spine plate to axially locate the spine plate along the bone screw. Likewise, the body portion and tapering

shoulder portions "fit together" with the surrounding bone to restrict movement of the bone screw and to block effluence from the opening in the bone portion.

Further contrary to Danek's assertions, construing "engage" as "fit together" does not impede the function of the claims. Even if the body portion does not completely block all of the thread gaps left in the bone by the threaded portion, the tapered shoulder portion of these screws is wider in diameter and does block the bone opening, thereby restricting effluence.

Danek also argues that the asserted claims require a screw with a body portion having a diameter equal to or greater than the crest diameter of the threaded portion because such a screw is disclosed in the written description. The written description does disclose a screw with a body portion "having a diameter D1 which is substantially equal to the crest diameter D2 of the threaded portion . . . and, thus, is larger than [the root diameter of the tap]." Col. 8, ll. 19-23.

In construing a means-plus-function limitation, a court must identify both the claimed function and the corresponding structure in the written description for performing that function. Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258, 52 USPQ2d 1258, 1263 (Fed. Cir. 1999). Under 35 U.S.C. § 112, ¶ 6, a court may not import into the claim structural limitations from the written description that are unnecessary to perform the claimed function. Id. In this case, the district court correctly identified "blocking effluence and restricting transverse movement" as the recited functions. The trial court then correctly concluded that the body portion 182 and the shoulder portion 184 perform these two functions together. To limit the body portion to a diameter at least as large as the crest diameter of the second externally threaded portion would be to impermissibly import into the claim limitation specific dimensions of a preferred embodiment that are unnecessary to perform the claimed function of blocking effluence and restricting transverse movement. This court will not limit a patent to its preferred embodiments in the face of evidence of broader coverage by the claims. See Electro Med. Sys. S.A. v. Cooper Life Sci., 34 F.3d 1048, 1054, 32 USPQ2d 1017, 1021 (Fed. Cir. 1994) ("[P]articular embodiments

appearing in a specification will not be read into the claims when the claim language is broader than such embodiments.").

Danek seeks to avoid infringement by attacking the trial court's claim construction. Because the district court's claim construction is correct, this court finds sufficient evidence for the jury to find infringement of the '311 patent's claims by all of the accused bone screws.

Anticipation

Danek argues that if the asserted claims of the '311 patent cover a body portion with a diameter less than the diameter of the thread, a reasonable jury would have found that the lag screw disclosed in the Konstantinou patent anticipates the claims of the '311 patent. In particular, Danek asserts that the shank portion (92) and the head portion (90) of the Konstantinou screw are the "means integral" recited in the claims of the '311 patent. Danek further argues that the Konstantinou screw would perform the "engaging" function as recited in the '311 patent's claims.

Normally, to invalidate a patent by anticipation a prior art reference needs to disclose each and every limitation of the claim. Standard Havens Prods., Inc. v. Gencor Indus., Inc., 953 F.2d 1360, 1369, 21 USPQ2d 1321, 1328 (Fed. Cir. 1991). "However, a prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it." Atlas Powder Co. v. Ireco Inc., 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1946 (Fed. Cir. 1999).

Claim 5 recites that the "means integral" has the function of both projecting into the bone opening and engaging a portion of the bone opening surface. The district court construed "means integral" as including both the body portion and the tapered shoulder of the screw. To anticipate, the Konstantinou patent must disclose, either directly or inherently, a body portion and a tapered shoulder that project into the bone opening, restrict movement of the bone screw, and block effluence. Konstantinou does not disclose these functions. Danek, therefore, had the

burden of putting forth evidence that made "clear that the missing descriptive matter is necessarily present in the . . . reference." Cont'l Can Co. v. Monsanto Co., 948 F.2d 1264, 1268-69, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

While the long shank in the Konstantinou screw may serve as a body portion, this shank directly abuts the rounded head portion without a tapering shoulder. Danek urges that the lower half of the Konstantinou screw head meets the written description of the shoulder portion in the '311 patent: "[A] tapering circular surface with a diameter which increases as the shoulder portion extends in a direction from the body portion toward the seat portion." AcroMed, however, put forth evidence of figures in the Konstantinou patent itself as well as the testimony of its expert, Dr. Katz, to show that the Konstantinou screw does not have a tapering shoulder.

Furthermore, the record does not show that the rounded head of the Konstantinou screw could act as a shoulder to necessarily project into the bone opening or play any role in restricting screw movement or blocking effluence. AcroMed actually put forth expert testimony and the Konstantinou patent itself to demonstrate that the head of the Konstantinou screw remains outside of the cortical bone. Without sufficient record evidence for the jury to find that the Konstantinou patent disclosed the "means integral" as recited in the claims of the '311 patent, the district court did not err in declining to grant JMOL that the Konstantinou patent anticipates the '311 patent.

CONCLUSION

This court affirms all of the district court's judgments in the present case.

COSTS

Each party shall bear its own costs.

AFFIRMED