

United States Court of Appeals for the Federal Circuit

99-1561, -1583

DEMARINI SPORTS, INC.,

Plaintiff-Appellant,

v.

WORTH, INC.,

Defendant-Cross Appellant.

Theodore F. Shiells, Gardere & Wynne, L.L.P., of Dallas, Texas, argued for plaintiff-appellant. With him on the brief was Edward Jorgenson.

Mark J. Patterson, Waddey & Patterson, of Nashville, Tennessee, argued for defendant-cross appellant. With him on the brief was Edward D. Lanquist, Jr.

Appealed from: United States District Court for the District of Oregon

Judge Garr M. King

United States Court of Appeals for the Federal Circuit

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v.

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DECIDED: February 13, 2001

Before SCHALL, BRYSON, and LINN, Circuit Judges.

LINN, Circuit Judge.

DeMarini Sports, Inc. ("DeMarini") appeals from the decision of the United States District Court for the District of Oregon granting the motion of Worth, Inc. ("Worth") for summary judgment ("SJ") of non-infringement of DeMarini's U.S. Patent No. 5,415,398 ("the '398 patent") and denying the motion of DeMarini for summary judgment of infringement of claim 15 of the '398 patent literally and of claims 1, 2, 15, and 18 of the '398 patent under the doctrine of equivalents. DeMarini Sports, Inc. v. Worth, Inc., No. 97-1693-KI (U.S. Dist. Ct. Or. Aug. 15, 1999) ("DeMarini II").

We hold that the district court's construction of the terms "frame" and "insert" was not erroneous. We also hold that the district court's construction of claim 15 to require that the large-diameter impact portion be part of a bat frame was not erroneous. Moreover, we conclude that no reasonable jury could find infringement either literally or under the doctrine of equivalents of claims 1, 2, 15, or 18 of DeMarini's '398 patent. Thus, we affirm the district court's judgment of no infringement.

BACKGROUND

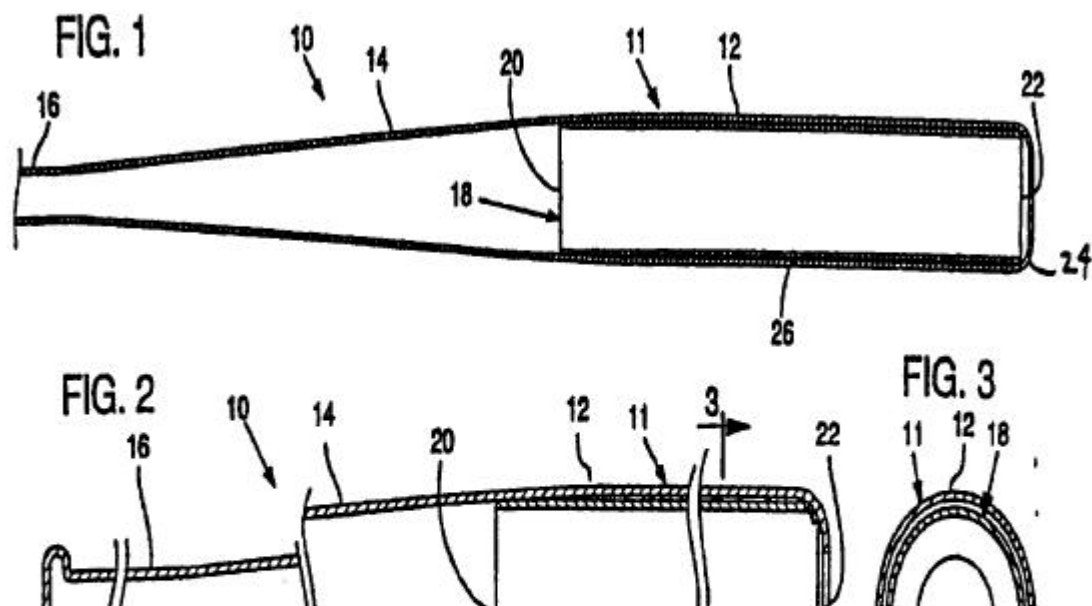
The technology of the '398 patent is high-performance double-walled aluminum

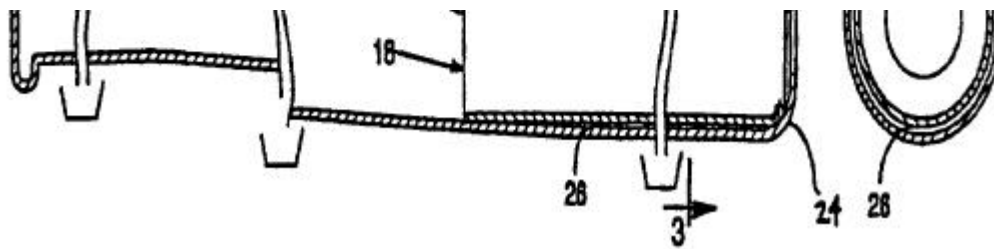
softball bats. In or around 1989, Ray DeMarini approached Michael Eggiman, the inventor of the '398 patent, and proposed that they form a part-time business designing and selling high-performance softball bats. Prior to embarking on this project, Eggiman knew nothing about bat design. His expertise was in the design of leaf springs for trucks and was gained at the suspension division of a truck manufacturing company where he worked as a full-time mechanical engineer with DeMarini.

Eggiman began his bat design efforts by studying commercially available bats. From his study, Eggiman concluded that one of the most important factors in bat performance was the thickness of the wall of the bat at the point of impact with a ball, i.e., the impact portion of the bat. Eggiman noted that although thicker-walled bats resisted denting and lasted longer, thinner-walled bats had better performance due to the ability of the wall of the bat to cave in and spring back -- an effect commonly referred to as the "trampoline effect." Eggiman's new understanding of the importance of the trampoline effect, coupled with his knowledge of the manner in which leaf springs are able to give and slide over one another, gave him the idea of a double-walled bat, i.e., a bat in which there are two concentric tubes, at least at the hitting end of the bat.

Eggiman considered two approaches to the design of a double-walled bat. The first approach was to insert one tube inside a traditional bat of the type having a relatively large diameter impact portion at one end and tapering to a relatively small diameter handle portion at the other end. The second approach was to take the traditional bat structure and position a larger diameter tube; i.e., an exterior shell, over the impact portion of the bat. However, in reducing his design to practice, Eggiman did not pursue the second approach because he did not know if such a construction would be safe. More particularly, he was not sure how to keep the exterior shell securely attached over the end of the bat.

The '398 patent application was filed on May 14, 1993, and finally issued on May 16, 1995. Figures 1, 2, and 3 of the '398 patent are shown below, depicting a described embodiment of the invention.





The '398 patent describes Figure 1 as disclosing a "bat 10" which has a "tubular aluminum frame 11 with a relatively large-diameter impact portion 12, an intermediate tapering portion 14, and a relatively small-diameter handle portion 16." '398 patent, col. 2, ll. 39-43. A "tubular insert 18 is suspended within the impact portion 12" and secured inside the tubular frame 11 at the insert's first end 20 and second end 22. *Id.*, col. 2, ll. 44-61. Also seen in Figure 1 is a gap 26 between "the insert 18 and the inner wall of the impact portion 12." *Id.*, col. 2, ll. 66-68. Figure 2 is a magnified cutaway view of Figure 1, *id.*, col. 2, ll. 33-34, and Figure 3 is a cross-sectional view taken along line 3—3 of Figure 2, *id.*, col. 2, ll. 35-36, showing that the "gap [26] extends uniformly around the insert [18]." *Id.*, col. 2, l. 68 – col. 3, l. 1.

A bat designed according to the claims of the '398 patent was marketed in 1993. The claims at issue of the '398 patent read as follows:

I. A bat, comprising:

a hollow tubular bat frame having a circular cross-section; and

an insert positioned within the frame, the insert having a circular cross-section, the insert having first and second ends adjoining the tubular frame, the insert being separated from the tubular frame by a gap forming at least part of an annular shape along a central portion between said first and second ends, the frame elastically deflectable across the gap to operably engage the insert along a portion of the insert between the insert first and second ends.

2. A bat according to claim 1 in which the insert is suspended within the frame and is secured thereto at said first and second ends.

15. In a hollow bat having a small-diameter handle portion and a large-diameter impact portion, an improvement comprising an internal structural insert defining an annular gap with an inside wall of the impact portion of the bat and the impact portion elastically deflectable to close a portion of the annular gap and operably engage the insert.

18. A bat, comprising:

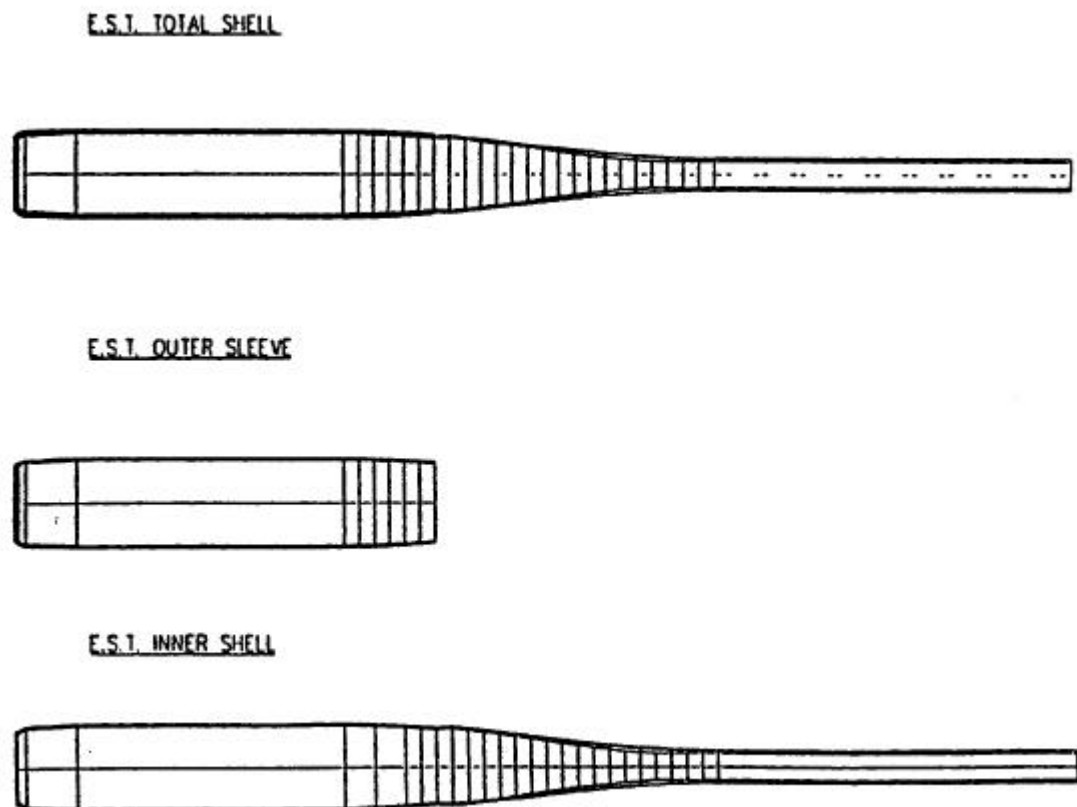
a hollow tubular bat frame having a small-diameter handle portion and a large-diameter impact portion having a circular cross-section with an inner and outer diameter;

at least one insert having a substantially circular cross-section with an outer diameter less than the inner diameter of the frame impact portion, the insert being held within the impact portion; and

the impact portion being inwardly elastically deflectable such to establish a tight interference fit between the insert and the impact portion.

'398 patent, col. 5, ll. 54-68; col. 6, ll. 37-43; and col. 6, l. 66 - col. 8, l. 5.

The Worth bat accused of infringing the foregoing claims of the '398 patent is a softball bat known as the "EST" bat. Instead of an insert disposed within the impact portion of the bat, Worth places an external shell over the hitting end of the bat. Three of Worth's engineering drawings of the EST bat are shown below.



During the design of the EST bat, Worth tested a commercial version of DeMarini's patented bat but was not aware of the existence of the '398 patent at that time. Worth admits, though, that it learned about the '398 patent prior to completing its design of the EST bat. Additionally, in 1996, Worth and DeMarini engaged in licensing negotiations over the '398 patent, but Worth was unable to obtain a license.

Despite the fact that Worth knew of the '398 patent before finishing the EST bat design, Worth contends that its EST bat design is based on independent design

concepts substantially different from those of the '398 bat. According to Worth, design efforts for the EST bat began prior to the issuance of the '398 patent. These efforts included research and development work done by a consultant for Worth, Dr. Speckhart, during the development of the Worth SUPERCELL 2 bat, introduced commercially in 1995. During his work on the SUPERCELL 2 project, Speckhart discovered that when a ball was hit with the large diameter impact portion of a conventional bat, the resulting bending of the tapered portion of the bat had a significant, positive effect on hitting performance. Worth refers to this bending phenomenon as the "diving board effect." From this discovery, Worth designed the SUPERCELL 2 bat focusing on the shape and thickness of the tapered portion of the bat.

Worth contends that in designing the EST bat, it was primarily concerned with maximizing the diving board effect it had begun to develop in the SUPERCELL 2 bats. To achieve the maximum benefit of the diving board effect, Worth's focus was on reducing the starting diameter of the tapered section of the EST bat. Worth knew that to be a successful bat, however, the EST would also have to provide the maximum diameter impact portion allowed by softball rules; i.e., 2.25 inches. According to Worth, with the foregoing concepts in mind, the EST bat was designed to have a hollow body that is tapered down to a handle at one end and is covered at the opposite "hitting end" by an exterior shell.

Worth specifically asserts that the diameter of the hollow body of the EST bat was designed to be less than the maximum diameter permitted for an impact portion of a softball bat so that the beginning of the tapered section could be as small as possible to provide for the greatest amount of bat bending. To accommodate this design and build the diameter of the impact portion back up to the maximum diameter allowed under the softball rules, the exterior shell was added at the hitting end. According to Worth, the EST exterior shell over the hitting end both increases the diameter and reinforces the bat in the area where it is intended to impact a ball. Because the diameter of the EST body where it is tapered is smaller than in conventional aluminum bats, bat bending is increased, which Worth believes increases the EST's slugging power.

DeMarini filed its infringement suit against Worth in the United States District Court for the District of Oregon ("the district court") on November 28, 1997, alleging that Worth's EST bat infringed claims 1, 2, 15, and 18 of DeMarini's '398 patent under the doctrine of equivalents. After DeMarini filed a motion for summary judgment of infringement under the doctrine of equivalents and Worth filed a reply thereto, the district court conducted a Markman hearing. DeMarini Sports, Inc. v. Worth, Inc., No. 97-1693-KI, slip op. at 2 (U.S. Dist. Ct. Or. Jan. 14, 1999) ("DeMarini I"). In a January 14, 1999 opinion, the district court set forth its construction of the only claim terms then in dispute, namely, "gap" as used in claims 1 and 15, and "interference fit" as used in claim 18. Id. at 4-9.

Following DeMarini I, Worth filed a motion for summary judgment of non-infringement of claims 1, 2, 15, and 18. DeMarini renewed its previous summary judgment motion and added a contention that the EST bat also literally infringed claim 15. The district court ruled on these motions in DeMarini II.

The district court found that Worth failed to satisfy its burden of proof that claim 18 was

invalid for indefiniteness and thus denied that summary judgment motion. DeMarini II, slip op. at 5. In addressing the motions regarding infringement, the district court noted sua sponte that it needed to construe the term "large-diameter impact portion" as used in claim 15, which term was not in issue at the time of the Markman hearing. After construing this term, the district court concluded that the Worth EST bat neither infringed claim 15 literally nor infringed claims 1, 2, 15, and 18 under the doctrine of equivalents. Id. at 6-14. The district court then granted Worth's summary judgment motion of non-infringement and denied DeMarini's summary judgment motion of infringement. Id. at 14.

DeMarini timely appealed the judgment regarding infringement and Worth cross-appealed the district court's construction of the claim terms "gap" and "interference fit." We have jurisdiction under 28 U.S.C. § 1295(a)(1) (1994).

DISCUSSION

Standard of Review

We review a district court's grant of summary judgment de novo. See Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 149 F.3d 1309, 1315, 47 USPQ2d 1272, 1275 (Fed. Cir. 1998). However, in reviewing a denial of a motion for summary judgment, we give deference to the trial court, and "will not disturb the trial court's denial of summary judgment unless we find that the court has indeed abused its discretion." Suntiger, Inc. v. Scientific Research Funding Group, 189 F.3d 1327, 1333, 51 USPQ2d 1811, 1815 (Fed. Cir. 1999). When both parties move for summary judgment, the court must evaluate each motion on its own merits, resolving all reasonable inferences against the party whose motion is under consideration. See McKay v. United States, 199 F.3d 1376, 1380 (Fed. Cir. 1999).

Summary judgment is appropriate only when there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. See Fed. R. Civ. P. 56(c). "In determining whether there is a genuine issue of material fact, the evidence must be viewed in the light most favorable to the party opposing the motion, with doubts resolved in favor of the opponent." Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1307, 46 USPQ2d 1752, 1755 (Fed. Cir. 1998). If there are no material facts in dispute precluding summary judgment, "our task is to determine whether the judgment granted is correct as a matter of law." Marathon Oil Co. v. United States, 177 F.3d 1331, 1337 (Fed. Cir. 1999).

A determination of infringement requires a two-step analysis. "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." Carroll Touch, Inc. v. Electro Mech. Sys., Inc., 15 F.3d 1573, 1576, 27 USPQ2d 1836, 1839 (Fed. Cir. 1993). "In order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device." Wolverine World Wide, Inc. v. Nike, Inc., 38 F.3d 1192, 1199, 32 USPQ2d 1338, 1341 (Fed. Cir. 1994). Claim construction is an issue of law, see Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-71, 34 USPQ2d 1321, 1322 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996), that we review de novo. See Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1172 (Fed. Cir. 1998) (en banc). The determination of infringement, whether literal or under the doctrine of equivalents, is a question of fact. See Bai v. L & L Wings, Inc., 160 F.3d 1350, 1353, 48 USPQ2d 1674, 1676 (Fed. Cir. 1998).

ANALYSIS

I. Claim Construction

"The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims." Embrex, Inc., v. Serv. Eng'g Corp., 216 F.3d 1343, 1347, 55 USPQ2d 1161, 1163 (Fed. Cir. 2000) (internal quotations and citation omitted). Interpreting the asserted claims begins with a review of the intrinsic evidence, which consists of the claim language, the written description, and the prosecution history. See id.; see also Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed. Cir. 1996). If the intrinsic evidence resolves any ambiguity in a disputed claim, extrinsic evidence cannot be used to contradict the established meaning of the claim language. See Mantech Envtl. Servs., Inc. v. Hudson Envtl. Serv., Inc., 152 F.3d 1368, 1373, 47 USPQ2d 1732, 1736 (Fed. Cir. 1998). Extrinsic evidence may, however, be accepted by the court to enhance its understanding of the technology. See EMI Group N. Am., Inc. v. Intel Corp., 157 F.3d 887, 892, 48 USPQ2d 1181, 1184 (Fed. Cir. 1998).

As to the review of the intrinsic evidence, the specification is reviewed to determine whether the patentee used terms in a manner inconsistent with their ordinary meaning. See Vitronics, 90 F.3d at 1582, 39 USPQ2d at 1577. The prosecution history is considered to determine whether or not there were any express representations made in obtaining the patent regarding the scope and meaning of the claims. See id.; see also Southwall Techs., Inc. v. Cardinal IG, Co., 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.")

A. Frame

As previously noted, in DeMarini II, the district court, before reaching the question of infringement, construed the term "large-diameter impact portion." DeMarini II, slip op. at 6-8. The court also found it a necessity to adopt a definition of the term "frame" or "bat frame" before reaching the issue of infringement. Id. at 6 n.1. The court adopted the interpretation "that the bat frame is the single piece with the large portion for hitting the ball at one end, tapering to the handle with a knob at the other end." Id.

DeMarini contends that the district court's construction of the claim term "frame" was improper. Specifically, DeMarini takes issue with the district court's construction of the term "frame" as modified by the term "bat" set forth in DeMarini II, i.e., "a single piece with a large portion for hitting the ball at one end, tapering to the handle with a knob at the other end." Id. DeMarini's basic position is that a "bat frame" is a hollow tube of the sort that covers the hitting end of a bat (i.e., an external shell that is large enough to hold an insert), and that an "insert" is a structure that incorporates both the handle and the portion of the hitting end of the bat that goes inside the external shell. DeMarini argues that this was how the term "frame" was construed in DeMarini I and that the district court improperly reinterpreted the term "frame" in DeMarini II. We do not agree that the district court reinterpreted the term "frame" in DeMarini II. In DeMarini I, the term "frame" was not in dispute and the district court's discussion of the term "frame" was simply to give context to the discussion of the disputed terms "gap" and "interference fit" and not to set forth a

binding definition. The court did not focus its attention on the structural requirements of a bat "frame" until it came time to grapple with the issue of literal infringement of claim 15, an issue raised by DeMarini only after the court released its DeMarini I opinion.

DeMarini presents five arguments as to why its proffered definition is correct and that of the district court in DeMarini II is erroneous. First, DeMarini notes that the ordinary meaning of frame is "an open structure or rim for encasing, holding or bordering." Second, DeMarini notes that an integral relationship of the handle, the impact portion, and the tapered portion of the frame is only described as a preferred embodiment in the written description and that this written description indicates that other configurations, such as separate pieces, fall within the scope of the invention. Third, DeMarini contends that a handle cannot be a required part of the frame since the insert of the invention cannot fit inside the handle. Fourth, DeMarini notes that in view of the discourse between the Examiner and the patentee regarding U.S. Patent No. 5,219,164, issued to Peng ("Peng '164"), it is clear that the Examiner understood that the term "frame" did not require an integral handle. Fifth, and last, DeMarini notes that, in view of the fact that it never attempted to distinguish its claimed invention from the Peng '164 insert, which extends outside the axial limits of the "frame," it obviously never considered that the claim term "frame" must include an impact portion and a handle.

DeMarini's arguments fail to persuade us that its proffered definition is the correct construction for the claim term "frame" as modified by the claim term "bat." We address each of DeMarini's contentions beginning first with the argument that a handle cannot be a required part of the frame because the insert of the invention cannot fit inside the handle. The district court's definition of frame does not require the insert to fit inside the handle, it merely requires that the insert be contained within some part of the frame which consists of the impact portion, the tapering portion, and the handle portion of the bat.

As we noted above, interpreting claims requires a review of all of the intrinsic evidence: the claim language, the written description, and the prosecution history. The claim language does little to elucidate what structure is described by "bat frame," and "bat frame" is not specifically defined in the written description. Consequently, we begin our construction of the term "bat frame" by looking at the ordinary meaning of the term "frame." We deem it appropriate to use the dictionary definition proffered by DeMarini; i.e., "an open structure or rim for encasing, holding or bordering," because it is a standard dictionary definition, which Worth does not dispute. DeMarini would have us end our analysis with this definition to reach its conclusion that this term only requires that one tube be large enough to accommodate a second tube inside of it. We decline DeMarini's invitation. We cannot look at the ordinary meaning of the term "frame" in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history of the '398 patent to determine the proper construction of that term as modified by the claim term "bat" and as used in the claims of the '398 patent.

The written description of the '398 patent indicates that the invention particularly relates to the use of structural members inside of softball or baseball bats to improve their impact response. '398 patent, col. 1, ll. 6-11. The patent discusses prior art attempts to provide for greater impact response by constructing tubular bats using materials other than aluminum, and the high cost and difficulty of working with materials such as titanium. Id. at ll. 49-56. The patent also discloses that prior art bats have been made using inserts, but that most of these inserts are positioned for vibration deadening purposes. Id. at ll. 57-59. In addition,

the patent recognizes that there is at least one prior art bat that uses an insert in a bat to improve the "repelling action" of the bat. Id. at ll. 59-62. But, the patent further discloses that the insert of that prior art bat is in "tight abutment within the tubular frame" of the bat, thus merely providing a thickened wall of the impact portion of the bat. Id. at ll. 60-68.

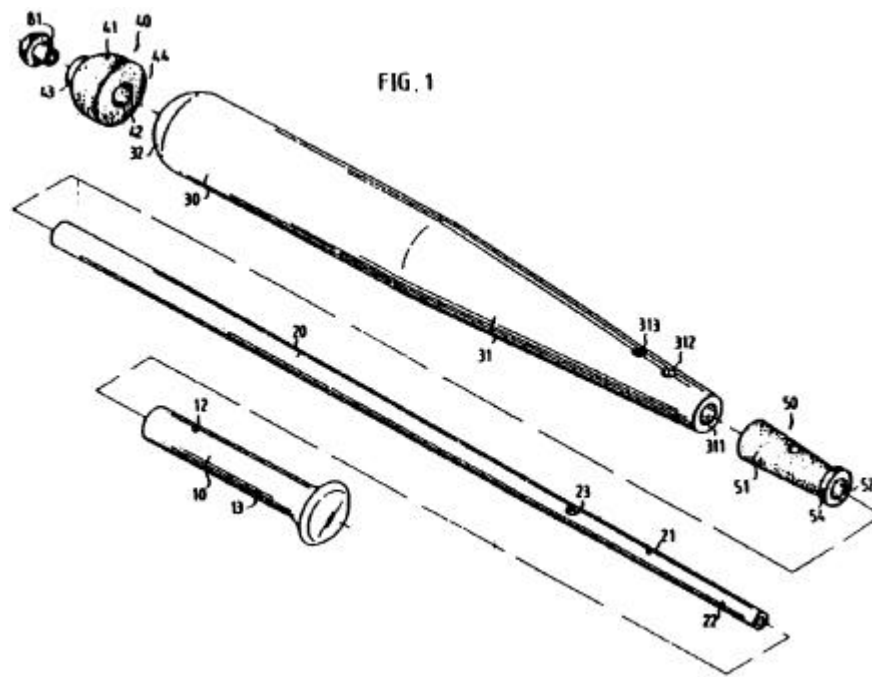
After its discussion of the prior art shortcomings, the patent indicates that one of the objects of the invention is to design a new bat with a simple construction. See id., col. 2, ll. 1-8. Thereafter, a preferred embodiment of the invention is described. See id., col. 2, ll. 9-23. That description includes a discussion of the external structure of the tubular bat frame, namely that it has a large-diameter impact portion, an intermediate tapering portion, and a small-diameter handle portion. The description also indicates where the tubular insert is positioned in the bat frame and the manner in which the tubular insert is suspended in the frame. Id.

The detailed description of the invention found at col. 2, l. 39, and continuing through col. 5, l. 52, which describes a manner of providing for an improved impact response according to one embodiment of the invention, notes, as does the "preferred embodiment," that the tubular bat frame has a relatively large-diameter impact portion, an intermediate tapering portion, and a relatively small-diameter handle portion. Id. at col. 2, ll. 39-49. This description then describes the insert and a manner of placing it within the frame to achieve an interference fit and obtain the leaf-spring effect and greater slugging capacity. Id. at col. 2, l. 50 - col. 3, l. 35. Other manners of achieving an interference fit by positive attachments of the insert are described at col. 4, ll. 24-60. At col. 5, ll. 33-45, the patent describes yet another embodiment of the invention in which a positive attachment of the insert to the frame may be dispensed with, while still achieving the leaf-spring effect. Thus, the detailed description of the invention discusses at great length a variety of ways of placing an insert within a bat frame to achieve greater slugging capacity through the leaf-spring effect.

Contrary to DeMarini's argument, the patent does not suggest a bat frame consisting of less than a handle, a tapered portion, and an impact portion. DeMarini points out that the patent indicates that forming the bat frame by swaging an integral, weld-free frame is only an exemplary manner of making the bat frame, and that "all permutations of component dimensions and configurations fall within the scope of the present invention." Id. at col. 3, l. 66 - col. 4, l. 23. The latter remark, however, comes just after the statement that "many permutations of bat frame, insert, and gap dimensions will work equally as well." In other words, the "components" contemplated in the "all permutations" remark clearly refers to the insert, the gap, and the bat frame as a whole—not just the handle, the taper portion, and the impact portion of the bat frame. Moreover, as for "swaging" only being an exemplary manner of constructing the bat frame, this remark only indicates that there are other methods aside from swaging that can be used to make the bat frame, i.e., that the bat frame structure need not be made in a single construction step—not that the frame does not include the handle, the tapering portion, and the impact portion.

Turning now to the prosecution history, we disagree with DeMarini that the discourse between the Examiner and the patentee regarding the U.S. Patent No. 5, 219,164 ("Peng '164 patent"), clearly shows that the Examiner understood that the term "frame" did not require an integral handle. The Peng '164 patent discloses the following with regard to its inventive bat structure: (1) an elongated handle 10, with an axial cavity formed therein; (2) a tapering tubular stem 20; (3) a generally cylindrical main body 30, with a taper section to the rear; (4) an elastic shock and vibration absorbing end piece 40; and (5) a guard piece

50. See Peng '164 patent, col. 1, ll. 4-10. The above-listed components are assembled together, with the end piece 40, the main body 30, the guard piece 50, and the handle 10 all arranged on the stem 20 to form a completed bat. This shock absorbing baseball bat structure can be seen in figure 1 immediately below.



The examiner rejected DeMarini's original claims 1 and 2 as being clearly anticipated by the Peng '164 patent under 35 U.S.C. § 102(e). Original claim 1 read:

A bat comprising:

a hollow tubular bat frame; and

an insert positioned within the frame, the insert having first and second ends adjoining the tubular frame, the insert being separated from the tubular frame by a gap along a central portion between said first and second ends.

In his rejection, the examiner did not make reference to any particular feature of the Peng '164 bat that he considered to be the "bat frame" or the "insert" in his rejection. It was only DeMarini, and not the examiner, who characterized the main body 30 as a "frame" and the tapering tubular stem 20 as an "insert." The examiner made no comment on DeMarini's naming of the parts of the Peng '164 bat. DeMarini would have us infer a meaning for the term "frame" drawn from the examiner's silence, rather than from its response to the examiner's rejection. Drawing inferences of the meaning of claim terms from an examiner's silence is not a proper basis on which to construe a patent claim, and we reject DeMarini's arguments predicated on such inferences.

DeMarini also contends that because it never argued that the Peng '164 insert distinguished the Peng '164 patent from the claimed invention by extending outside the axial limits of the "main body 30," DeMarini never considered the claim term "frame" to include an impact portion and a handle. However, just as we can draw no inference from

what the examiner did not say, we can draw no inference from what DeMarini did not argue. It could just as easily be presumed from DeMarini's silence that DeMarini recognized that when the "main body 30" was connected to the handle, the "insert" of the Peng '164 bat did not extend beyond the "bat frame" of the Peng '164 bat, just as the claimed "insert" does not extend beyond the "bat frame."

In view of the ordinary definition of the term "frame" and the explanation of that term in conjunction with the term "bat" in the written description and intrinsic record, we conclude that "frame" as modified by the term "bat" and used in claims 1 and 18 means a tubular structure having a large-diameter impact portion, a tapered portion and a small-diameter handle, all of which are connected when the bat is fully constructed for its intended use. This is substantially the same definition of "bat frame" given by the district court in DeMarini II.

B. Large-diameter impact portion

To resolve the issue of literal infringement of claim 15, the district court found it necessary to construe the terms "large-diameter impact portion." DeMarini II, slip op. at 6-7. The district court construed the claim to require that the "large-diameter impact portion" of the hollow bat be a part of a bat frame, id. at 7, even though the court recognized that claim 15 does not explicitly include the term "frame." Id. at 6 n.1. The court concluded that a bat frame was an implicit limitation of "large-diameter impact portion" for two reasons. First, the court recognized from the prosecution history that DeMarini itself had characterized the "large-diameter impact portion" as being part of a bat frame when it distinguished claim 15 from all of the prior art references "by reciting the frame impact portion being elastically deflectable . . ." (emphasis added.) Second, the district court noted that the preamble of a Jepson claim recites elements known in the prior art, and it is common in the prior art for the impact portion to be part of the bat frame. Id. at 6-7.

DeMarini contends that it was improper for the district court to interpret "impact portion" of claim 15 to include a "frame" limitation, because the term "frame" is not used in that claim. DeMarini further argues that the language of claim 15 does not require the impact portion to be integrally connected to the handle, and the language of the claim does not preclude the "internal structural insert" from being integrally connected to the handle. DeMarini also argues that in the specification the "impact portion" is defined as ending where the tapering portion begins.

In addition, according to DeMarini, it was improper for the district court to read "impact portion" in claim 15 to include a "frame" limitation based on statements from the prosecution history because those statements were made with respect to the elastic deflection and operative engagement of the gap not to the structure of the impact portion itself or the relationship of the impact portion to the handle. Finally, DeMarini argues that the Peng '164 patent demonstrates that the prior art contemplates frames having large-diameter impact portions that are not integral with handles.

We do not find any of these arguments to be persuasive. We note that claim terms are not construed in a vacuum. Rather, to interpret claim terms we look to all of the intrinsic evidence as it pertains to the terms in question. We are, however, mindful that the language of the claims as allowed is what we construe, and it is that language that determines the limitations of the claim. See Intervet Am., Inc. v. Kee-Vet Labs., Inc., 887 F.2d 1050, 1054,

12 USPQ2d 1474, 1477 (Fed. Cir. 1989).

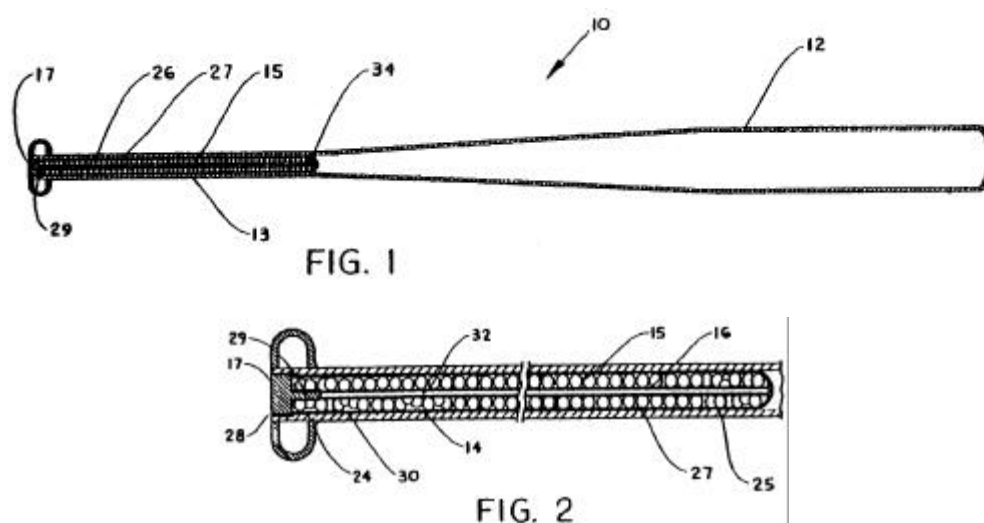
A review of the prosecution history convinces us that the district court was correct in construing the language of the preamble of claim 15 to require that the "large-diameter impact portion" of the hollow bat be a part of a bat frame even though claim 15 does not explicitly include the claim term "frame."

Original claim 15 recited:

In a hollow bat, an improvement comprising an internal structural insert defining an annular gap with an inside wall of the bat.

In the first office action, the examiner rejected DeMarini's original claim 15 as being anticipated by U.S. Patent No. 5,180,163, issued to Lanctot et al. ("Lanctot") under 35 U.S.C. § 102(e), indicating that spine 16 of Lanctot was considered to be the insert.

As can be seen in figures 1 and 2 immediately below, the spine 16 (figure 2) of Lanctot is affixed within the handle portion of the baseball bat comprising an elongated body with an impact portion of one diameter tapering to a handle portion with a reduced diameter. The spine is intended to dampen shock components generated when the bat strikes a ball. See col. 3, l. 54-col. 4, l. 45.



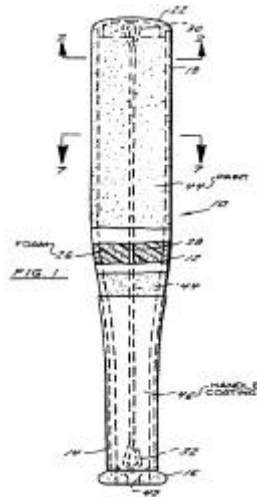
In response to the Lanctot rejection, DeMarini amended claim 15 as follows:

In a hollow bat having a small-diameter handle portion and a large diameter impact portion, an improvement comprising an internal structural insert defining an annular gap with an inside wall of the impact portion of the bat.

DeMarini further remarked that the foregoing amendment was made "to point out that the structural insert defines an annular gap with the inside wall of the impact portion of the bat." Furthermore, DeMarini noted that the Lanctot spine "is positioned in the handle portion of the bat . . ." and that the Lanctot "insert would not be positioned in the bat impact portion . . ."

In view of that amendment, the Examiner rejected claim 15 as being anticipated by U.S. Patent No. 4,056,267, issued to Krieger ("Krieger") under 35 U.S.C. 102(b). The Examiner indicated that it was device 28 of Krieger that was considered to be the insert.

The structure of the Krieger bat can be seen in figure 1 immediately below. The Krieger bat 10 is a metal bat formed of a metal tube 12 having a handle portion 14 with a knob 16 at one end and having a barrel portion 18 with an open end to which an end cap is welded. Device 28 is a safety-strengthening device surrounded by foam in the tube and anchored between the barrel and handle ends of the bat. See Krieger col. 2, l. 57-col. 3, l. 3.



In response to the Krieger rejection, DeMarini again amended claim 15, adding the following phrase at the end of the claim: "and the impact portion elastically deflectable to close a portion of the annular gap and operably engage the insert." DeMarini remarked that this amendment was made "to distinguish over all of the references, by reciting the frame impact portion being elastically deflectable to close a portion of the gap to engage the insert."

The foregoing prosecution history clearly reflects that DeMarini considered the impact portion to be a part of a hollow bat structure, i.e., a bat frame, even though claim 15 never included the word frame, and even though some of the statements made distinguishing the invention from the prior art as a whole reflect additional aspects of the invention. The foregoing is distinguishable from Intervet where the applicant argued that all of the claims included a limitation added by amendment, but which turned out to have only been added to certain claims, not all of them. See Intervet, 887 F.2d at 1053-54, 12 USPQ2d at 1477. In this case, it is clear that DeMarini first amended claim 15 to add the structural components of a handle portion and an impact portion to the claimed hollow bat in order to distinguish the relationship of the insert to these components from similar components in the prior art. Moreover, the original claim language clearly indicates that the internal structural insert is not a structural element of the hollow bat. Thus, DeMarini considered the handle portion and the impact portion to be part of a bat frame that surrounded the internal structural insert even though the specific term "frame" was not used in claim 15.

Considering all of the intrinsic evidence--i.e., the claim language, the written description, and the prosecution history, we conclude that the "hollow bat" having the "small-diameter

handle portion" and the "large-diameter impact portion" of claim 15 requires the handle and the impact portion to be part of a frame that surrounds the claimed internal structural insert. As noted above, we do, however, agree with DeMarini that the frame need not be fabricated as a single structural element. The pieces can be formed separately and connected prior to use of the bat in its intended environment.

C. Insert

In addition to the interpretation of the term "frame" as modified by the term "bat," it is necessary to construe the following phrases from claims 1, 15, and 18 to understand the literal limitations of these claims: (1) "an insert positioned within the frame" (claim 1); (2) "an internal structural insert" (claim 15); and (3) an "insert being held within the impact portion" (claim 18). DeMarini, in its brief to this court, proffers an "ordinary" definition of the term "insert" as "anything put or fit into something else." Worth does not contest this definition. With this definition, DeMarini takes the position that any portion of the internal section of the bat extending beyond the large-diameter impact portion cannot be the claimed "insert," but is instead an additional structural feature.

While we accept DeMarini's proffered "ordinary" definition of the term "insert," we disagree with DeMarini's position, noting that it is irrelevant to the claims at issue whether the "insert" is considered limited to something that is fully within the impact portion or not, since all three claims make clear that the bat frame, which includes the impact portion and the handle, completely surrounds and is separate from the "insert."

In claim 1, the "insert" is stated to be "positioned within the [bat] frame." Claim 15 sets forth the external structural requirements of the bat as having a large-diameter impact portion tapering to a small-diameter handle, and it is in the bat so described that the internal structural insert is positioned. Finally, in claim 18, the structural requirements of the "bat frame" are set forth, including a large-diameter impact portion and a small-diameter handle portion, and the "insert" is noted to be "held within the impact portion" of that "bat frame." The foregoing, coupled with the undisputed definition of "insert," leads us to the inevitable conclusion that "an insert positioned within the frame" (claim 1); "an internal structural insert" (claim 15); and, an "insert being held within the impact portion" (claim 18) means that the bat frame, which has a large-diameter impact portion tapering to a small-diameter handle, completely surrounds a piece of material (the "insert") that is separate from the frame.

We need not address the parties' contentions regarding the district court's construction of the terms "gap" and "interference fit," because, as will be discussed below, comparison of the Worth EST bat to the claims in view of the interpretation of "frame" and "insert" is dispositive of the infringement issues on appeal.

II. Infringement

After claim construction, the next step in an infringement analysis is comparing the properly construed claims with the allegedly infringing devices. See Kemco Sales, Inc. v. Control Papers Co., 208 F.3d 1352, 1360, 54 USPQ2d 1308, 1312 (Fed. Cir. 2000). This is a question of fact. See id. Thus, if we agree with the district court that there are no genuine issues of material fact regarding infringement of the '398 patent, and the movant is entitled to judgment as a matter of law, we affirm the district court's grant of summary judgment.

See Fed. R. Civ. P. 56(c); see also Celotex, 477 U.S. at 322; Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc., 212 F.3d 1377, 1381, 54 USPQ2d 1841, 1843 (Fed. Cir. 2000) (holding that a fact issue is not in genuine dispute if a reasonable jury could only find in favor of the moving party).

A. Literal Infringement

Literal infringement of a claim occurs when every limitation recited in the claim appears in the accused device, i.e., when "the properly construed claim reads on the accused device exactly." Amhil Enters., Ltd. v. Wawa, Inc., 81 F.3d 1554, 1562, 38 USPQ2d 1471, 1476 (Fed. Cir. 1996).

The only claim that DeMarini contends is literally infringed by the Worth EST bat is claim 15. The district court concluded that there was no literal infringement of this claim because there was no structural insert internal to the frame of the EST bat. The court came to this conclusion because it determined that the only structure of the Worth EST bat that could be the "frame" was the overall bat structure over which the shell is disposed because that was the only structure having an integrated large-diameter portion, tapered portion, and small-diameter handle portion.

DeMarini contends the district court's error is twofold. First, DeMarini notes that reading "large-diameter impact portion" on the EST hollow body is contrary to agreed upon facts. Second, DeMarini asserts that the district court improperly decided an issue of fact contrary to substantial evidence. As to DeMarini's first contention, DeMarini alleges that Worth's expert agreed that "impact" portion reads on the exterior shell of the EST. As to DeMarini's second contention, DeMarini asserts that its expert attested to the EST hollow body inner tube being internal to the exterior shell, and that this testimony is substantial evidence that the EST bat has a structural insert internal to a frame as is claimed.

We do not understand Worth's expert to have agreed that the claim term "large-diameter impact portion" of claim 15 reads on the exterior shell of the EST. While it is true that Worth's expert agreed that the outer shell of the EST bat was the portion of the bat that impacted the ball, this expert did not state that the shell was the "impact portion" as that term was used in claim 15.

Moreover, accepting DeMarini's expert's testimony as substantial evidence that the EST bat has a structural insert internal to a frame as those terms are used in claim 15 runs contradictory to the construction of claim 15 set forth above. As we stated above, the claimed insert must be contained within the bat frame, which frame includes an integrated large-diameter impact portion and small-diameter handle. The hollow body inner tube of the EST bat is not contained within such a bat frame, and the shell of the EST bat is not a bat frame that includes an integrated large-diameter impact portion and small-diameter handle.

Thus, neither of DeMarini's arguments persuades us that Worth's EST bat literally infringes claim 15. Consequently, we affirm the district court's conclusion on summary judgment that Worth's EST bat does not literally infringe claim 15.

B. Infringement Under the Doctrine of Equivalents

Infringement under the doctrine of equivalents requires that the accused product contain

each limitation of the claim or its equivalent. See Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40 (1997) ("Warner Jenkinson") (noting that because each limitation contained in a patent claim is material to defining the scope of the patented invention, a doctrine of equivalents analysis must be applied to individual claim limitations, not to the invention as a whole). An element in the accused product is equivalent to a claim limitation if the differences between the two are "insubstantial" to one of ordinary skill in the art. See id.

However, there are limits to the application of the doctrine of equivalents aside from the question of insubstantiality of the differences. For instance, there can be no infringement under the doctrine of equivalents if the asserted scope of equivalency would encompass the prior art. See Marquip, Inc. v. Fosber Am., Inc., 198 F.3d 1363, 1367, 53 USPQ2d 1015, 1018 (Fed. Cir. 1999); Wilson Sporting Goods v. David Geoffrey & Assoc., 904 F.2d 677, 683, 14 USPQ2d 1942, 1948 (Fed. Cir. 1990). In addition, prosecution history estoppel can prevent a patentee from relying on the doctrine of equivalents when the patentee relinquishes subject matter during the prosecution of the patent, either by amendment or argument. See Pharmacia & Upjohn Co. v. Mylan Pharm., Inc., 170 F.3d 1373, 1376-77, 50 USPQ2d 1033, 1036 (Fed. Cir. 1999).

Furthermore, the question of insubstantiality of the differences is inapplicable if a claim limitation is totally missing from the accused device. See Warner-Jenkinson, 520 U.S. at 33-34; Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 934-35, 939, 4 USPQ2d 1737, 1739-40 (Fed. Cir. 1987) (en banc). However, whether or not a limitation is deemed to be vitiated must take into account that when two elements of the accused device perform a single function of the patented invention, or when separate claim limitations are combined into a single element of the accused device, a claim limitation is not necessarily vitiated, and the doctrine of equivalents may still apply if the differences are insubstantial. See Dolly, Inc. v. Spalding & Evenflo Companies, Inc., 16 F.3d 394, 398, 29 USPQ2d 1767, 1769-70 (Fed. Cir. 1994).

DeMarini argued before the district court that the EST accomplishes the same function (increasing the trampoline deflection), in substantially the same way (with a leaf-spring-like action), to achieve substantially the same result (improved hitting performance). Moreover, DeMarini contended that, like the accused infringing device in Corning Glass Works v. Sumitomo Electric U.S.A., Inc., 868 F.2d 1251, 9 USPQ2d 1962 (Fed. Cir. 1989), Worth's EST bat presented a classic example of transposition of two elements. Therefore, DeMarini argued that infringement under the doctrine of equivalents should be upheld on summary judgment just as it was in Corning Glass.

In framing the issue this way, DeMarini improperly directed the district court's attention away from the language of the claims and toward a more general comparison of the overall attributes of the accused device with those of the claimed device. However, in this case, the district court properly avoided such a general comparison and instead compared the limitations of the claims with the specific elements of the accused device. In making this proper comparison, the district court did not accept DeMarini's argument of insubstantial differences.

The district court distinguished Corning Glass on the ground that in Corning Glass an alternative design was unknown to science, whereas Eggiman had considered an exterior shell design over a frame and still chose words that narrowly defined the claimed invention.

The court noted that the EST bat consists of two pieces when assembled, namely a bat frame plus an exterior shell. The court remarked that the EST shell is conceptually quite distant from an insert, and an internal location is substantially different from an external location. In other words, the court concluded that the differences between the insert required by the claims and the EST's shell are substantial. Thus, the court determined that summary judgment of no infringement of claims 1, 15, and 18 under the doctrine of equivalents was mandated.

DeMarini contends that the district court's attempt to distinguish Corning Glass is erroneous in that there is no requirement that equivalents be unknown to science at the time of the application. DeMarini is correct in this regard. Nevertheless, the district court's decision was not inconsistent with our decision in Corning Glass.

DeMarini characterizes Corning Glass as a mere reversal of parts case involving the reciprocal change of coating elements. While we agree with DeMarini that in Corning Glass the alleged infringer effected a reciprocal change in the accused device to achieve the identical result of the claimed device, we disagree that the reciprocal change was a reversal of structure. Thus, we disagree with DeMarini that the difference in Worth's EST bat compared to the claimed bat is just like Corning Glass.

In Corning Glass, the patented invention related to an optical fiber having a doped fused silica core and a fused silica cladding around the core, such that the core's refractive index (RI) was greater than that of the cladding, i.e., a positive RI differential. 868 F.2d at 1255, 9 USPQ2d at 1964. This refraction differential channeled light signals through the core for optical communications. Id. at 1254, 9 USPQ2d at 1963. According to the claims, the core included a positive dopant in excess of that of the cladding layer to provide a positive RI differential. Id. at 1256, 9 USPQ2d at 1965. The accused fiber contained no dopant in the core. Id. at 1259-60, 9 USPQ2d at 1968-69. Instead, this fiber achieved a positive RI differential by having negative dopant in the cladding. Id. Thus, the accused fiber retained a core, a cladding, and a dopant to maintain the relationship of the respective RI between the core and the cladding. In other words, no structural claim limitations were rearranged, only the relative characteristics of the structures were reciprocally changed.

In the case at bar, the difference between the accused bat and the claimed invention is more profound than in Corning Glass. To compare the claimed insert to the Worth EST shell involves a structural rearrangement and redefinition of claim limitations in which the functional relationships of these structural limitations is not maintained, i.e., if the claimed insert is the exterior shell of the EST, the large diameter portion of the EST frame is no longer available to be impacted by the ball. Corning Glass is factually quite different from the instant case, and therefore, does not control the outcome here. In Moore U.S.A., Inc. v. Standard Register Co., 229 F.3d 1091, 56 USPQ2d 1225 (Fed. Cir. 2000), we noted that "[w]hile Sanitary Refrigerator [Co. v. Winters, 280 U.S. 30 (1929)] undisputedly refers to 'reciprocal changes,' it nowhere authorizes the rearrangement of claim limitations." Id. at 1108. Similarly, we note that Corning Glass does not authorize rearrangement of structural claim limitations.

To support its contention that the Worth EST bat merely reverses parts of the claimed invention, DeMarini presents a hypothetical claim allegedly showing that each limitation is met by a corresponding reversed-parts complement in the EST. The hypothetical claim 1 is as follows:

1. A bat, comprising:

a hollow tubular bat frame having a circular cross-section; and

an [insert] shell positioned [within] outside the frame, the [insert] shell having a circular cross-section, the [insert] shell having first and second ends adjoining the tubular frame, the [insert] shell being separated from the tubular frame by a gap forming at least part of an annular shape along a central portion between said first and second ends, the [frame] shell elastically deflectable across the gap to operably engage the [insert] frame along a portion of the insert between the [insert] shell first and second ends.

(bracketed material deleted and underlined material added).

We do not find this hypothetical claim argument persuasive, noting in particular that in rewording the claim to accommodate the reciprocal change argument while maintaining some semblance of the claimed structural and functional relationships between the bat frame and the insert, DeMarini substitutes the term "insert" in some cases for the term "shell" and in other cases for the term "frame;" and, it substitutes the term "shell" in some cases for the term "insert" and in other cases for the term "frame." In its own example, DeMarini is unable to merely substitute the term "shell" for "insert" or "shell" for "frame." Instead, it has to rely on linguistic chicanery. DeMarini's hypothetical claim emphatically shows that this is not a case of a mere reciprocal change of two interacting elements, where one element cannot be changed without changing the other to make it operative, but involves a clear difference between the structure of the alleged infringing product and the invention as it has been defined by the limitations of the claims, as drafted.

It is one thing to effect a mere reciprocal change, but it is quite another thing when a limitation in a claim is simply missing. In the present case, the claims, as properly construed, require an insert contained within a bat frame comprised of a handle portion, a tapered portion, and an impact portion. The EST bat does not have such a configuration, instead having an exterior shell in which the insert that is positioned within the shell has a handle and extends beyond the shell. "If [DeMarini], who was responsible for drafting and prosecuting the patent, intended something different, it could have prevented this result through clearer drafting." *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 951, 28 USPQ2d 1936, 1939 (Fed. Cir. 1993). We are thus constrained to conclude that no reasonable juror could read the claims in issue on the EST bat structure. The district court concluded that an inference of no infringement under the doctrine of equivalents arises when a competitor attempts to design around a patent. Such a conclusion is clearly inconsistent with the Supreme Court's decision in *Warner Jenkinson*, 520 U.S. at 36 ("intent plays no role in the application of the doctrine of equivalents"). We nevertheless agree that equivalence is untenable in light of the claims as properly construed. Thus, we affirm the district court's grant of summary judgment of no infringement under the doctrine of equivalents.

CONCLUSION

In light of our disposition of the infringement issues, we need not and do not address Worth's cross-appeal on the construction of the claim terms "gap" and "interference fit."

AFFIRMED