

United States District Court,
N.D. Illinois.

ELKAY MANUFACTURING COMPANY,
Plaintiff.

v.
EBCO MANUFACTURING COMPANY and Ebtech Corporation,
Defendants.

July 13, 1998.

MEMORANDUM OPINION AND ORDER

ANDERSEN, J.

This suit is an action for patent infringement involving the two largest water cooler manufactures in the United States. The technology at issue in this lawsuit involves water cooler adapters designed to fit conventional bottled water coolers and to be used with the no-spill caps manufactured and sold by cap manufacturers. For the following reasons, we find that Defendants have infringed the patents-in-suit and that these patents are valid and enforceable.

I. BACKGROUND

Elkay Manufacturing Company ("Elkay") is the plaintiff in this action. Elkay's Cordley-Temprite division manufactures and sells a variety of bottled water coolers and no-spill adapters. The no-spill adapters are sold under the brand name "Water Safe." Elkay owns the two patents-in-suit.

Defendant Ebco Manufacturing Company is the dominant bottled water cooler manufacturer in the United States. Defendant Ebtech Corporation is a joint venture between Ebco Manufacturing Company and Hydotechnology Inc., a company owned by Bruce Burrows ("Burrows"). (Defendants are hereinafter jointly referred to as "Ebco"). Ebco manufactures and markets a no-spill adapter, the accused device, under the brand name "WaterGuard."

Ebco sells the largest number of bottled water coolers in the industry. Elkay's market share is a distant second followed by Sunroc Corporation ("Sunroc"), another bottled water cooler manufacturer.

Elkay and Ebco are virtually the only sources for no-spill adapters in the United States and they directly compete with each other for sales of bottled water coolers and no-spill adapters. (Statement of Undisputed Facts, para. 14.1-14.3). Sunroc purchases no-spill adapters from Ebco. Elkay has separately sued Sunroc for infringement. That lawsuit is currently pending in the United States District Court for the Northern District of Illinois.

Although not a primary player in the water cooler industry, the Liqui-Box Corporation ("Liqui-Box") plays

a role in the facts and circumstances in this lawsuit. Liqui-Box manufactures liquid dispensing products including plastic molded water bottles and bag-in-box containers and connectors. (Tr. 1436, 1551-1552). Neither Sunroc nor Liqui-Box are parties to the instant lawsuit.

Spilling is the primary problem connected with the use of conventional bottled water coolers. As the heavy uncapped bottle is lifted and inverted for placement on top of the water cooler cabinet, water often spills. Likewise, when the bottle is removed from the water cooler, any water remaining in the bottle spills out. Hygiene is another concern. Water may become contaminated when the person placing the bottle on the cooler places his hand over the open end of the bottle. Furthermore, airborne dust, dirt, and other contaminants can enter and accumulate in the water cooler reservoir which is open on top so that air may be drawn through the system. (Statement of Undisputed Facts, para. 8.4-8.5). The asserted patents disclose a solution to these recognized problems.

Because Elkay's market share of water cooler sales lagged far behind that of Ebco, Elkay viewed the development of a solution to the spilling and hygiene problems as a means to differentiate and improve its product and, therefore, increase its market share. Thus, Elkay had a strong incentive to develop the invention disclosed in the patents-in-suit. Ultimately, Elkay used its no-spill adapter to dramatically increase its share of the bottled water cooler market.

The asserted Elkay patents disclose "an inverted water bottle or liquid container having a resealable cap and a support for the inverted water bottle and a feed tube or probe for dispensing drinking water or other potable liquid from the inverted container into the reservoir of the bottled water cooler after the resealable cap is opened by the feed tube or probe." (Statement of Undisputed Facts, para. 6.1). In sum, the invention provides no-spill bottle installation and removal, a filtered air supply, and a reservoir that is sealed to keep out contaminants.

Henry E. Baker and his sons, John B. Baker, David H. Baker, and Peter K. Baker, (collectively the "Bakers") are named as joint inventors of the patents-in-suit. The Bakers own and operate Crystal Rock Spring Water Co., Inc., a bottled water distributing company in Waterford, Connecticut. In addition, the Bakers are the principals of Baker Development Company which entered into an agreement on August 8, 1988 with Elkay regarding some of the technology disclosed in the patents-in-suit. Edward H. Donselman ("Donselman"), a project product engineer at Elkay's Cordley-Temprite division is another joint inventor. Ronald C. Katz ("Katz"), Elkay's Chairman of the Board, is also a joint inventor. (Statement of Undisputed Facts, para. 7.1-7.3).

In October 1988, Elkay displayed several prototype Water Safe adapters at the International Bottled Water Association trade show in Atlanta, Georgia. Elkay launched commercial sales of its Water Safe product in late 1990. Ebco began selling its WaterGuard product in 1992. Burrows designed the WaterGuard devices. Elkay's patent number 5,222,531 (the " '531 patent") and patent number 5,289,855 (the " '855 patent") issued on June 29, 1993 and March 2, 1994 respectively.

Elkay alleges that Ebco directly and literally infringes claims 1-5 and 7-10 of Elkay's '531 patent and claims 1-3 of Elkay's '855 patent through Ebco's manufacture, use, sale, and offering for sale of the WaterGuard no-spill adapters. Alternatively, Elkay contends that the accused adapters infringe these claims under the doctrine of equivalents. Elkay seeks money damages and injunctive relief.

Ebco denies that its no-spill adapters infringe the patents-in-suit and seeks a declaration that these patents

are invalid, unenforceable, and not infringed. Specifically, Ebco charges that the patents-in-suit are invalid because: (1) Elkay failed to name the proper inventors; (2) the '531 and '855 patents are anticipated by a prior work; and (3) the invention is obvious in view of the prior art. Additionally, Ebco claims that the patents-in-suit are unenforceable because Elkay engaged in inequitable conduct during the patent prosecution process.

This Court conducted a 29 day bench trial. At the beginning of the trial, Elkay dismissed with prejudice its claims based on its 5,295,519 and 5,289,854 patents. In turn, Ebco dismissed its declaratory judgment counterclaims on these patents without prejudice. The parties submitted post-trial briefs and this Court heard closing arguments. This Memorandum Order and Opinion presents the Court's findings of fact and conclusions of law with respect to all issues necessary to resolve this dispute.

II. THE PATENT CLAIMS AT ISSUE

Patent No. 5,222,531

1. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid to a predetermined maximum liquid level in a dischargeable reservoir open at its upper end and housed within a cabinet from an inverted unpressurized container having an internal liquid confining surface defined by a substantially rigid, generally cylindrical body with a radially inwardly directed downwardly sloping shoulder portion merging into a generally cylindrical depending neck defining an opening closed by a coaxial cap circumferentially surrounding at least an outer axial portion of said neck and having an internal recess therein including a hollow tubular sleeve portion and a sealing plug portion defining a closed end with a central cavity having internal gripping means therein connected thereto, comprising, in combination,

removable mounting means adapted to fit on the upper portion of said cabinet and defining an annular ring for supporting said sloping shoulder portion of said inverted container thereon, said removable mounting means also defining a tapered entry portion having a substantially closed inner wall extending downwardly and inwardly from said annular ring for receiving said depending container neck and said coaxial cap therein, said entry portion having a substantially closed bottom end and a length greater than that of said depending container neck and said coaxial cap when said inverted container shoulder portion is supported on said annular ring,

sealing means carried by said removable mounting means for sealingly closing said open upper end of said reservoir,

an upstanding feed tube dimensioned to penetrate into said hollow tubular sleeve portion of said coaxial cap and said container neck to provide a hygienic flow path for delivering liquid from said inverted unpressurized container into said reservoir to said predetermined maximum liquid level and for admitting air from said reservoir above said liquid level into said container to displace the liquid delivered therefrom, said feed tube having upper and lower end portions, means carried by said removable mounting means for rigidly supporting said upstanding feed tube with said upper end projecting upwardly from said bottom end of said entry portion and said lower end depending downwardly from said bottom end of said entry portion of said removable mounting means into said reservoir to define said predetermined maximum liquid level,

said upper end of said feed tube having a length greater than said recess in said coaxial cap and being disposed and adapted for entry into said recess to axially separate said cap plug portion from said hollow tubular sleeve portion when said container is inverted and lowered onto said mounting means with said

sloping shoulder portion of said inverted container supported by said annular ring in order to permit the discharge of liquid from said container into said reservoir to said predetermined maximum liquid level and admission of air from said reservoir above said liquid and into said container,

and said upstanding feed tube being disposed and dimensioned to hold said cap plug portion free of contact with said hollow tubular sleeve portion of said coaxial cap and said internal liquid confining surface of said inverted container when said sloping shoulder portion is supported on said annular ring of said mounting means.

2. A system as defined in claim 1 wherein said feed tube includes an internal bore and a radial inlet communicating therewith, said inlet being spaced from the tip end of said feed tube by a distance greater than the internal depth of said internal cavity of said plug portion of said coaxial cap.
3. A system as defined in claim 1 wherein said upper end of said feed tube is formed with complementary external gripping means for securing said plug on said feed tube when said feed tube is inserted in said recess of said coaxial cap and said plug portion is axially separated from said hollow tubular sleeve portion.
4. A system as defined in claim 3 wherein said internal gripping means includes a radially inwardly projecting annular lip formed in said plug cavity and said external gripping means includes an annular groove formed in said tip portion of said upper end of said feed tube.
5. A system as defined in claim 1 wherein said plug portion is dimensioned to sealingly interfit with said hollow tubular sleeve portion when said inverted container is lifted off said support ring and said feed tube is withdrawn from said recess of said coaxial cap.
7. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid to a predetermined maximum liquid level in a dischargeable reservoir open at its upper end and housed within a cabinet from an inverted unpressurized container having a substantially rigid body with a radially inwardly directed downwardly sloping shoulder portion merging into a generally cylindrical depending neck defining an opening closed by a coaxial cap circumferentially surrounding at least an axial outer portion of said neck and having an internal recess therein including a hollow tubular sleeve portion and a sealing plug portion defining a closed end with a central cavity having internal gripping means therein connected thereto, comprising, in combination,

removable mounting means adapted to fit on the upper portion of said cabinet and defining an annular ring for supporting said sloping shoulder portion of said inverted container thereon, said removable mounting means also defining a tapered entry portion extending downwardly and inwardly from said annular ring for receiving said depending container neck and said coaxial cap therein, said entry portion having a substantially closed bottom end and a length greater than that of said depending container neck and said coaxial cap when said inverted container shoulder portion is supported on said annular ring,

an elongated feed tube having a tip end, a substantially hollow tubular body portion and a base portion including support means for orienting said feed tube substantially vertically in said tapered entry portion with said tip end pointed upwardly for admitting air into and dispensing drinking water or other potable liquid from within said inverted substantially rigid unpressurized container,

said feed tube body portion being dimensioned for close fitting sealing relation with the inside diameter of

said internal cap recess to prevent leakage there between when said feed tube is inserted into and through said recess,

said hollow feed tube having an internal bore and at least one radial opening communicating therewith, said radial opening being spaced from said tip end of said feed tube by a distance that is greater than the internal depth of said plug cavity, said radial opening and said bore defining fluid passage means for dispensing liquid from said container into said reservoir up to said predetermined liquid level and for admitting air from said reservoir above said liquid level into said container to displace said dispensed liquid and

said fluid passage means being unobstructed by internally or externally disposed valving to permit the free flow of liquid and air therethrough.

8. A liquid container support and hygienic liquid dispensing system as defined in claim 7 wherein said feed tube tip end has a reduced cross sectional diameter for insertion into said plug cavity and said tip end has complementary external gripping means for cooperating with said internal gripping means in said plug cavity for securing said plug on said feed tube tip when said feed tube is inserted into and through said internal recess of said coaxial cap.

9. A liquid container support and hygienic liquid dispensing system as defined in claim 8 wherein said internal gripping means includes a radially inwardly projecting annular lip formed in said plug cavity and said external gripping means includes an annular groove formed in the tip portion of said feed tube.

10. A liquid container support and hygienic liquid dispensing system as defined in claim 9 wherein said feed tube tip is formed with a tapered annular ramp portion adjacent said groove for guiding said inwardly projecting annular lip in said plug cavity into said annular groove.

Patent No. 5,289,855

1. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid to a predetermined maximum liquid level in a dischargeable reservoir open at its upper end and housed within a cabinet from an inverted unpressurized container having an internal liquid confining surface defined by a substantially rigid, generally cylindrical body with a radially inwardly directed downwardly sloping shoulder portion merging into a generally cylindrical depending neck defining an opening closed by a coaxial cap circumferentially surrounding at least an outer axial portion of said neck and having an internal recess therein including a hollow tubular sleeve portion and a plug and recess sealing portion connected thereto and defining a closed end with a central cavity having internal gripping means therein comprising, in combination,

removable mounting means adapted to fit on the upper portion of said cabinet and defining an annular ring for supporting said sloping shoulder portion of said inverted container thereon, said removable mounting means also defining a tapered entry portion having a substantially closed inner wall extending downwardly and inwardly from said annular ring for receiving said depending container neck and said coaxial cap therein, said entry portion having a substantially closed bottom end and a length greater than that of said depending container neck and said coaxial cap when said inverted container shoulder portion is supported on said annular ring.

sealing means carried by said removable mounting means for sealingly closing said open upper end of said reservoir,

an upstanding feed probe dimensioned to penetrate into said hollow tubular sleeve portion of said coaxial cap and said container neck to provide a hygienic flow path for delivering liquid from said inverted unpressurized container into said reservoir to said predetermined maximum liquid level and for admitting air from said reservoir above said liquid level into said container to displace the liquid delivered therefrom, said feed probe having upper and lower end portions,

means carried by said removable mounting means for rigidly supporting said upstanding feed probe with said upper end projecting upwardly from said bottom end of said entry portion and means depending downwardly from said bottom end of said entry portion of said removable mounting means into said reservoir to define said predetermined maximum liquid level,

said upper end of said feed probe having a length greater than said recess in said coaxial cap and a tip portion disposed and dimensioned for entry into said recess to axially separate said cap plug and recess sealing portion from said hollow tubular sleeve portion when said container is inverted and lowered onto said mounting means with said sloping shoulder portion of said inverted container supported by said annular ring in order to permit the discharge of liquid from said container into said reservoir to said predetermined maximum liquid level and admission of air from said reservoir above said liquid and into said container,

said tip portion of said upstanding feed probe being formed with complementary external gripping means disposed and dimensioned for securing said plug and recess sealing portion on said feed probe and for holding said plug and recess sealing portion free of contact with said internal liquid confining surface of said inverted container when said feed probe is inserted in said recess of said coaxial cap to axially separate said plug and recess sealing portion from said hollow tubular sleeve portion when said sloping shoulder portion of said inverted container is supported on said annular ring of said mounting means, and said upstanding feed probe being dimensioned and disposed to draw said plug and recess sealing portion into interfitting sealing relation with said hollow tubular sleeve portion when said inverted container is lifted off said support ring and said feed probe is withdrawn from said recess of said coaxial cap.

2. A system as defined in claim 1 wherein said internal gripping means includes at least one radially inwardly projecting lip portion formed in said plug cavity and said external gripping means includes an annular groove formed in said tip portion of said upper end of said upstanding feed probe.

3. A system as defined in claim 2 wherein said feed probe tip portion is formed with a tapered annular ramp portion adjacent said annular groove for guiding said inwardly projecting lip portion in said plug cavity into said annular groove.

III. FINDINGS OF FACT AND CONCLUSIONS OF LAW

A. Infringement

Pursuant to 35 U.S.C. s. 271(a), "whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefore, infringes the patent." The infringement determination requires a two step analysis. *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1476 (7th Cir.1998). First, as a matter of law, the court must construe the asserted claims to determine their scope and meaning. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed.Cir.1995), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1986). Second, as a matter of fact, the fact finder must determine whether the defendant's allegedly

infringing activity falls within the scope of the claims as construed. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 371, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). To succeed, the plaintiff must demonstrate by a preponderance of the evidence that the accused structure meets every limitation of a claim either exactly or by an equivalent. *Kahn v. Gen. Motors Corp.*, 135 F.3d 1472, 1476 (Fed.Cir.1998); *Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1405 (Fed.Cir.1996).

1. Markman Ruling

A patent is a government grant of rights which permits the patentee to exclude others from making, using, or selling the invention as claimed. 35 U.S.C. s. 154. Therefore, a patent must describe the exact scope of an invention in order to define the limits of the patentee's rights and "apprise the public of what is still open to them." *Markman*, 517 U.S. at 373 (*quoting* *McClain v. Ortmayer*, 141 U.S. 419, 424, 12 S.Ct. 76, 35 L.Ed. 800 (1891)). To accomplish these objectives, a patent document contains two distinct elements. The first is a specification which describes the invention "in such full, clear, concise, and exact terms as to enable any person skilled in the art ... to make and use the same." 35 U.S.C. s. 112. The second element is "one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." *Id.*; *see also* *Markman*, 517 U.S. at 373-74 (stating, "[t]he claim define[s] the scope of a patent grant and functions to forbid not only exact copies of an invention, but products that go to the heart of the invention but avoid literal infringement by making a noncritical change") (internal quotations and citations omitted).

Before resolving the issue of infringement, the court must determine the scope of the claims of the patent as a matter of law. *Markman*, 52 F.3d at 979. In light of *Markman*, the Federal Circuit has cautioned trial judges that:

[i]t may well be that in some cases one side will offer the correct interpretation to the judge. More often, however, it is likely that the adversaries will offer claim interpretations arguably consistent with the claims, the specification, and the prosecution history that produce victory for their side. In any event, the judge's task is not to decide which of the adversaries is correct. Instead the judge must independently assess the claims, the specification, and if necessary, the prosecution history, and relevant extrinsic evidence and declare the meaning of the claims.

Exxon Chem. Patents, Inc. v. Lubrizol Corp., 64 F.3d 1553, 1556 (Fed.Cir.1995), *reh'g en banc denied*, 77 F.3d 450 (Fed.Cir.), *cert. denied*, 518 U.S. 1020, 116 S.Ct. 2554, 135 L.Ed.2d 1073 (1996).

To interpret the claims, the court must first examine the relevant intrinsic evidence, namely the patent itself, including the language of the claims and specifications, and the prosecution history. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996); *Markman*, 52 F.3d at 979. Typically, the court will need to look no further than the available intrinsic evidence to resolve an ambiguity in a disputed term. *See* *Vitronics*, 90 F.3d at 1582. If the intrinsic evidence "unambiguously describe[s] the scope of the patented invention, reliance on extrinsic evidence is improper." *Id.* at 1584; *Markman*, 53 F.3d at 981. *E.g.*, *Applied Telematics, Inc. v. Sprint Communications Co., Inc.*, No. Civ. A. 94-CV-4603, 1996 WL 421920 (E.D.Pa. Jan.5, 1996), *aff'd in part and vacated in part on other grounds*, 101 F.3d 716 (Fed.Cir.1996). Extrinsic evidence is that evidence which is external to the patent and file history including, but not limited to, expert testimony, inventor testimony, dictionaries, technical treatises and articles, and prior art not cited in the prosecution history. *Vitronics*, 90 F.3d at 1584.

By construing the patent claims, the court defines the federal legal rights created by the patent document. *Markman*, 52 F.3d at 978. Because it is the claims and not the specifications, that are subject to infringement, *Bradshaw v. Igloo Prod. Corp.*, 912 F.Supp. 1088, 1095 (N.D.Ill.1996), courts must neither narrow nor broaden the scope of a claim to give the patentee something different than what he has set forth. *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed.Cir.), *cert. denied*, 488 U.S. 986, 109 S.Ct. 542, 102 L.Ed.2d 572 (1988). Unless the patentee chooses to be his own lexicographer and states her special definition in the patent specification or file history, words in a claim are given their ordinary and customary meaning. *Vitronics Corp.*, 90 F.3d at 1582.

With these rules in mind, we now turn to the disputed claim language. The parties raise no issue regarding the interpretation of any terms or language in the patents. Rather, the parties dispute only the scope of the preamble language.

An independent claim stands on its own and does not refer to any other claim in the patent. It must therefore be read separately when determining its scope. A dependent claim includes a reference to at least one other claim in the patent and must be interpreted to encompass each of its own elements as well as any additional elements recited in the referenced claim. *Lampi Corp. v. American Power Prod.*, No. 93 C 6762, 1997 WL 392239,*1 (N.D.Ill. July 8, 1997). Claims 1 and 7 of the '531 patent and claim 1 of the '855 patent are independent claims and claims 2-5 and 8-10 of the '531 patent and claims 2-3 of the '855 patent are dependent.

The independent claims of the patents asserted here are written in the combination claim format and include a preamble, a transitional phrase, i.e., "comprising in combination," and a body setting forth the elements of the claimed combination. *Ebco* argues that the preamble language of the asserted independent claims requires a "coaxial cap" and "container" which are absent from its accused device. *Elkay* contends that the preamble language merely defines the field of relevant prior art and the scope of the claimed invention.

Pursuant to the parties' agreement, we resolved the *Markman* issue on the paper record without a hearing. On July 3, 1997, we issued a minute order finding that the preamble language did not limit the scope of the asserted claims and that the preamble limitations did not become elements of the claimed combination. We now set forth more fully our reasoning.

Preamble recitations do not limit the scope of the claim if the language merely states a purpose or intended use of the invention. *In re Paulsen*, 30 F.3d 1475, 1478 (Fed.Cir.1994). Moreover, preamble limitations may give life, meaning, and vitality to the claims without becoming elements of the claimed combination. *See Williams Mfg. Co. v. United Shoe Mach. Corp.*, 316 U.S. 364, 368, 62 S.Ct. 1179, 86 L.Ed. 1537 (1942). Accordingly, the patentee "may define and limit an invention in terms of that invention's intended environment without claiming the environment as part of a combination with the invention." *Smith Corona Corp. v. Pelikan, Inc.*, 784 F.Supp. 452, 463 (M.D.Tenn.1992), *aff'd*, 1 F.3d 1252 (Fed.Cir.1993). *Accord In re Stencel*, 828 F.2d 751, 754-755 (Fed.Cir.1987) (stating that structural recitations in the preamble may limit the claimed elements but are not necessarily elements of the claimed combination).

Here, the pertinent preamble language recites a bottled water delivery system which includes a container with a sloping shoulder portion and a coaxial cap with a plug portion. ('531 patent, claim 1, col. 7, l. 55-col. 8, l. 2 and claim 7, col. 9, ll. 19-33; '855 patent, claim 1, col. 7, l. 58-col. 9, l. 6). The limitations recited in the preambles to the asserted claims, however, are not structural elements of the claimed combination and function only to identify the context and environment in which the claimed combination interact. *See e.g.*

Smith Corona Corp., 784 F.Supp. at 452 (finding that the asserted claims "do not claim all typewriter ink ribbon cassettes broadly, but ink ribbon cassettes designed to function in the described environment of compatible correction cassettes and typewriter switches). Indeed, it would be difficult to describe an improvement to a bottled water delivery system without naming such a system as the thing to which the patent is addressed and equally difficult to refrain from referring to various parts of the system, such as the liquid container or the cap. *See Williams Mfg. Co.*, 316 U.S. at 369. Therefore, the "coaxial cap" and "container" recited in the preamble to the asserted claims are not elements of the claimed combination. Accordingly, the structures recited in the preamble language do not have to be present in the accused device for that device to infringe the claimed invention.

This conclusion is further supported by the prosecution history of the asserted patents. The prosecution history "cannot 'enlarge, diminish, or vary' the limitations in the claims." *Markman*, 52 F.3d at 980 (citation omitted). The prosecution history only "limits the interpretation of the claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed.Cir.), *cert. denied*, 516 U.S. 987, 116 S.Ct. 515, 133 L.Ed.2d 424 (1995).

The '531 patent is a continuation of Application Serial No. 684,642 which issued as patent number 5,121,778 (the " '778 patent"). During the prosecution of the '531 patent, Elkay submitted new independent claims 16 and 22 which issued as claims 1 and 7 of the '531 patent. The preamble of claims 16 and 22 were patterned after the preamble of claim 1 of the '778 patent with additions including a more detailed description of the liquid container and cap. Based on the additions, the Examiner stated that "in the base claims 16 and 22 the container cap and plug portion is clearly not part of the claimed combination." (JTX 1, Paper No. 4, p. 3).

Ebco further argues that the specifications establish that the asserted invention is not the adapter alone but rather a "system" which achieves its objectives through the interrelationship of the inverted water bottle, the coaxial cap, the feed tube of the adapter, and the annular support ring. We disagree.

Even though the specifications and drawing disclose a bottled water delivery system, the claims of the '531 and '855 patents are directed to the elements of the adapter, the supporting means and the specially designed feed tube which interact with a particular type of cap. Although the claims must be read in light of the specifications, *Markman*, 52 F.3d at 979, it is the claims, and not the specifications, that define the invention. *Ortho Pharm. Corp. v. Smith*, 959 F.2d 936, 943 (Fed.Cir.1992). The specification, however, cannot limit or enlarge the claims. *Markman*, 52 F.3d at 980. Thus, "simply because 'claims are interpreted in light of the specification does not mean that everything expressed in the specification must be read into all the claims.' In addition, references to a preferred embodiment, such as those in the specifications or drawings, are not claim limitations." *C & F Packing Co., Inc. v. IBP, Inc.*, 916 F.Supp. 735, 743 (N.D.Ill.1995). Accordingly, we find that the specifications in the '531 and '855 patents do not require that the cap and container become part of the claimed combination.

In sum, after reviewing the asserted claims, the specifications, and the prosecution histories, the Court interprets the asserted claims as follows. The preamble language merely defines the field of relevant prior art and the scope of the claimed invention. Specifically, the "coaxial cap" and "container" recited in the preambles to the asserted claims are not elements of the claimed combination. The claims of the asserted patents are directed to different inventive aspects of the adapter for use on the commonly disclosed system found in the preamble. Thus, to infringe Ebco need not produce or sell the coaxial cap and the container.

2. Literal Infringement

Based on the evidence presented at trial, we find that each and every element recited in the asserted claims of the '531 and '855 patents finds direct and literal response in the accused WaterGuard I, II and III no-spill adapters.

To establish literal infringement, a plaintiff must demonstrate that every limitation in the claim is literally met by the accused device. *Rohm and Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1091 (Fed.Cir.1997); *Kahn v. General Motors Corp.*, 135 F.3d 1472, 1477 (Fed.Cir.1998). This determination is question of fact that must be proved by a preponderance of the evidence. *Id.* Ebco cannot avoid infringement by merely adding additional elements to its accused device if each element recited in the claims is found in the accused WaterGuard adapters. *See Stiftung v. Renishaw PLC*, 945 F.2d 1173, 1178 (Fed.Cir.1991); *A.B. Dick Co. v. Burroughs Corp.*, 713 F.2d 700, 703 (Fed.Cir.1983), *cert. denied*, 464 U.S. 1042, 104 S.Ct. 707, 79 L.Ed.2d 171 (1984). "For example, a pencil structurally infringing a patent claim would not become noninfringing when incorporated into a complex machine that limits or controls what the pencil can write. Neither would infringement be negated simply because the patentee failed to contemplate the use of the pencil in that environment." *Id.* Moreover, "if structural claims were to be limited to devices operated as a specification-described embodiment is operated, there would be no need for claims." *SRI Int'l v. Matsushita Elec. Corp. of America*, 775 F.2d 1107, 1121 (Fed.Cir.1985). *Accord Markman*, 52 F.3d at 980 (noting that specifications "do not delimit the right to exclude"). Thus, whether the accused WaterGuard devices contain one or more features in addition to those recited in the asserted claims is irrelevant to the infringement determination.

There is no genuine dispute that the accused adapters contain most of the elements of each of the claims at issue and, based on the evidence presented at trial, we agree. The infringement controversy centers around three issues: (1) the feed tube or feed probe, (2) the removable mounting means, and (3) the Blackhawk Molding Company's two-piece cap.

To support literal infringement, Elkay presented its technical expert Mr. Louis T. Sands ("Sands"). Over the last twenty years, Sands has performed consulting work for bottled water, drinking water, and pure water companies, governments, and individuals worldwide. (Tr. 187). Using a computer monitor, Sands displayed the language of the asserted claims on one half of the monitor while the other half of the monitor displayed the relevant portion of the accused WaterSafe adapters. As he testified, Sands read each line of the asserted claims and used a light pen and color coding to demonstrate how the corresponding structure and/or relationship was found in the accused adapters. (PTX 174-200B). Hard copies of Sands' drawing were then printed out for the parties and the Court. In this manner, Sands compared each line of the claim language to the structure of the accused adapters and concluded that Ebco's WaterGuard adapters meet every limitation in the asserted claims and, thus, literally and directly infringe the asserted claims. We found Sands to be a highly credible, knowledgeable witness and consider his testimony highly probative and persuasive. Accordingly, we adopt the reasoning and analysis found in Sand's testimony and accompanying exhibits. The relevant claims charts showing how the Ebco devices correspond to the asserted claims are as follows:

'531 PATENT		'855 PATENT	
CLAIM	PTX	CLAIM	PTX
1	174- 180	1	198,198A-E, 199, 200

2	181	2	200A
3	182- 183	3	200B
4	184- 185		
5	186- 187		
7	188- 193		
8	194- 195		
9	196		
10	197		

a. Feed Tube/Feed Probe

Claim 1 of the '531 patent, col. 8, ll. 21-29, specifies, "*an* upstanding feed tube dimensioned to penetrate into said hollow tubular sleeve portion of said coaxial cap and said container neck to provide a hygienic path for delivering liquid from said inverted unpressurized container into said reservoir to said predetermined maximum liquid level and for admitting air from said reservoir above said liquid level into said container to displace the liquid delivered therefrom, said feed tube having upper and lower end portions." (Emphasis added). The '855 patent contains the same limitation but substitutes the term "feed probe" for "feed tube." ('855 patent, col. 8, ll. 24-34). Claim 7 of the '531 patent, col. 9, l. 47-col. 10, l. 6, recites, "*an* elongated feed tube having a tip end, a substantially hollow tubular body portion and a base portion including support means for orienting said feed tube substantially vertically in said tapered entry portion with said tip end pointed upwardly for admitting air into and dispensing drinking water or other potable liquid from within said inverted substantially rigid unpressurized container." (Emphasis added).

Ebco argues that the trial record "clearly establishes" that the feed tube or feed probe on the accused adapters is structurally and functionally different from the feed tube or probe claimed and described in the '531 and '855 patents. (Ebco's Response to Elkay's Brief, p. 7). More specifically, Ebco contends that the asserted patents "claim, describe and illustrate a feed tube or probe having a *single flow path* for passage of both water *and* air. In contrast, the accused WaterGuard adapters have a feed tube or probe with *two separate flow paths* for *separated and simultaneous* passage of water and air." (*Id.* at pp. 7-8, emphasis supplied). Notwithstanding Ebco's contention, we find that the evidence presented at trial establishes by a preponderance of the evidence that the language of the asserted claims reads literally on the accused adapters and specifically on their feed tubes or probes.

Initially, we note that Ebco did not contest the meaning or interpretation of the terms "feed tube," "feed probe," or "path" recited in the asserted claims during the *Markman* claim interpretation stage of this litigation. Thus, we will afford these terms their ordinary and customary meaning. *Vitronics Corp.*, 90 F.3d at 1582. We will not, as Ebco urges, interpret the relevant terms more narrowly or more restrictively than usual. The pertinent claim language uses the article "an" to delineate one feed tube or probe. "An" does not qualify or limit the path through which the air and water pass. Moreover, claim 7 of the '855 patent does not use the language "a hygienic flow path" relied upon by Ebco. We find that the asserted claim language does not preclude a separation of the air and water flow or otherwise require the intermingling of air and water within the feed tube. Thus, the pertinent claim language reads on feed tubes or probes having single, dual, or

separate passages for air and water flow.

Ebco's accused adapter has an inner tube located concentrically within the WaterGuard feed tube or probe. The inner tube enhances the flow of air and water through the tube and reduces "glugging" as the water is dispensed. This improvement, however, does not undermine the conclusion that Ebco's adapters infringe the asserted patents. Because the path for water and air is contained within one upstanding and elongated feed tube or feed probe as required by the asserted claims, the inclusion of the additional inner tube does not avoid infringement. *See* Stiftung, 945 F.2d at 1178-79; Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1057-58 (Fed.Cir.), *cert. denied*, 488 U.S. 825, 109 S.Ct. 75, 102 L.Ed.2d 51 (1988). Whether Ebco's feed tube/feed probe is classified as having a single or dual chamber, the inner tube is simply an additional component added inside the feed tube and it does not allow Ebco to avoid infringement.

Ebco's citation to the specifications and prosecution history of the '531 and '855 patents are unpersuasive. The claims, not the specifications, are subject to infringement. Markman, 52 F.3d at 980 (stating "simply because 'claims are interpreted in light of the specification does not mean that everything expressed in the specification must be read into all the claims" ') (internal citation omitted). Similarly, the prosecution history cannot diminish or vary the limitations of the claims. *Id.*; Southwall Tech., Inc., 54 F.3d at 1576. Therefore, Ebco's accused adapters contain the feed tube or probe recited in the asserted claims.

b. Removable Mounting Means

Each of the independent claims of the '531 and '855 patents recite as a claimed element, "removable mounting means adapted to fit on the upper portion of said cabinet" ('531 patent, claim 1, col. 8, ll. 3-4 and claim 7, col. 9, ll. 34-35; '855 patent, claim 1, col. 8, ll. 7-8). Moreover, the invention defined by the asserted claims is consonant with the stated patent objective of "retrofitting exiting water coolers," '531 patent, col. 2, ll. 3-5; '855 patent, col. 2, ll. 4-6, with an adapter which provides a liquid container support and no-spill hygienic delivery system with a re-seal feature.

Ebco contends that the claims require a removable mounting means that is "supported" on the upper portion of the cabinet instead of being "supported" on the reservoir. Accordingly, Ebco asserts that its WaterGuard II and III adapters do not infringe the asserted claims when mounted on its model RR and SR coolers because its adapters are "supported" by the top of the removable reservoir not the top cover of the cabinet as required in the claim language. We disagree with Ebco's assertion.

Again, we note that Ebco raised no issue as to the interpretation of the terms of the asserted claims and we will not now read these claims in a special or restrictive manner. *See* Vitronics Corp., 90 F.3d at 1582. Thus, as long as the structure of the accused device has the capability of functioning in the manner described by the claims, i.e., the adapter is capable of being adapted to fit on the upper portion of the cabinet, Ebco's adapters infringe the asserted claims. *See* Intel Corp. v. Int'l Trade Comm'n, 946 F.2d 821, 832 (Fed.Cir.1991); Cyrix Corp. v. Intel Corp., 846 F.Supp. 522, 536 (E.D.Tex.1994), *aff'd*, 42 F.3d 1411 (Fed.Cir.1995).

We find that the pertinent claim language imparts a structural limitation that the removable mounting means be structured or dimensioned so that it is capable of being adapted to fit on the upper portion of the cabinet. *See* Sealed Air Corp. v. Int'l Packaging Sys., No. Civ. A. 86-0365-R. 1987 WL 44350,*16 (E.D.Va. July 24, 1987) (finding, "the word 'adapted' is used to indicate that the arrangement is capable of holding material into the reservoir"); *In re Venezia*, 530 F.2d 956, 959 (C.C.P.A.1976). The claims do not require that the

removable mounting means rest on or be supported by the upper portion of the cabinet. Indeed, none of the asserted claims specify or contain any limiting language defining how the removable mounting means itself is supported on the upper cabinet. Whether the WaterGuard II and III adapters are supported by the top rim of the removable reservoir, the top portion of the cabinet of the RR and SR coolers, or both is immaterial. Ultimately, it is the lower portion of the cabinet that "supports" both the removable reservoir and the upper portion of the cabinet. Thus, any distinction based on "support" fails. The key inquiry is whether the accused adapters are capable of fitting on the upper portion of the cabinet. We find that they are.

At trial, Katz and Sands both demonstrated and testified that Ebco's WaterGuard II and III adapters are designed to be removably mounted on the top cover or lid of Ebco's Oasis water cooler. (Tr. 22-26, 133, 225-26; PDX 339, 353-2 of 3, 353-3 of 3). In addition, Katz explained and demonstrated how a WaterGuard II adapter, with the addition of a stiffener ring above the reservoir seal and a spacer ring under the adapter flange, is adapted to fit on the upper portion of an Ebtech Model SR water cooler. (Tr. 133; PDX 338, 354-1 of 3, 354-2 of 3). Sands also testified that a WaterGuard III could be installed on the upper portion of an Ebtech SR model water cooler with the addition of an expander or follower ring above the reservoir seal. (Tr. 242-244; PDX 318, 338).

Plaintiff's Trial Exhibits PTX 17, PTX 10; and PTX 9 contain cross-sectional views of a WaterGuard I, II and III adapter, respectively, installed on a conventional Ebco Oasis water cooler. Significantly, Ebco admits that its adapters are "usable with existing coolers of different manufacturers." (Ebco's Post Trial Brief on Invalidity and Unenforceability, p. 4 n. 6).

In sum, we find that the accused adapters constitute the requisite "removable mounting means" and are capable of fitting on the upper portion of the cabinet. Therefore, for the foregoing reasons we find that the asserted claims read on the accused adapters regardless of how they are supported on the upper portion of the cabinet.

c. Blackhawk Molding Company Two-Piece Cap

The preambles to the asserted claims require a specified type of "coaxial cap." ('531 patent, claim 1, col. 7, l. 65-col. 8, l. 2, and claim 7 col. 9, ll. 27-33 and '855 patent, claim 1, col. 7, l. 67 to col. 8, l. 5). At trial, Ebco argued that the two-piece cap made by Blackhawk Molding Company does not respond to the literal language of claim 5 of the '531 patent. It is irrelevant to the question of Ebco's infringement whether Blackhawk Molding Company's two-piece cap or any other cap meets the literal language of the asserted claims. The "cap" is recited in the preambles and, therefore, the cap is not an essential element of the combination defined in the asserted claims. *See supra* s. III, A, 1. So long as Ebco's accused adapters are capable of functioning with any of the available no-spill caps in the manner defined by the claims, and we have already found that they are, the adapters infringe the asserted patents. *See Intel Corp.*, 946 F.2d at 832; *Sealed Air Corp.*, 1987 WL 44350 at *16. Accordingly, Ebco's manufacture, use, sale, and offer for sale of the accused adapters constitutes infringement regardless of whether Ebco's customers use the WaterGuard adapters with a particular no-spill cap.

d. Conclusion on Literal Infringement

Based on the foregoing, we find that Elkay has demonstrated by a preponderance of the evidence that Ebco's WaterGuard adapters meet every claim element of each of the asserted claims. Accordingly, we find that the accused Ebco WaterGuard adapter directly and literally infringe the '531 and '855 patents.

3. Doctrine of Equivalents

An accused product may still infringe even if literal infringement does not exist. Under the doctrine of equivalents, a patentee is protected from competitors who "make unimportant and insubstantial changes and substitutions to a patent which, though adding nothing, would be enough to take the copied matter outside the claim" thereby depriving the patentee of the benefit of her invention. *Graver Tank & Mfg. Co., Inc. v. Linde Air Prod. Co.*, 339 U.S. 605, 607-608, 70 S.Ct. 854, 94 L.Ed. 1097 (1950). Recently, in *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997), the United States Supreme Court clarified the doctrine of equivalents. The Court held that the infringement determination under the doctrine of equivalents is an objective inquiry made on an element-by-element basis. *Id.* at 1054. Accordingly, the essential inquiry is whether "the accused product or process contain elements identical or equivalent to each claimed element of the patented invention." *Id.* Under this analytical framework, a patentee must prove, by a preponderance of the evidence, either that the substituted element in the accused device performs substantially the same function in substantially the same way to produce substantially the same result as the element at issue or that insubstantial differences exist between the substitute element and the claimed element. *Id.*; *Multiform Desiccants, Inc. v. Medzan, Ltd.*, 133 F.3d 1473, 1480 (Fed.Cir.1998). "In other words, if a claim limitation must play a role in the context of the specific claim language, then an accused device which cannot play that role, or which plays a substantially different role, cannot infringe under the doctrine of equivalents." *Vehicular Tech. Corp. v. Titan Wheel Int'l, Inc.*, 141 F.3d 1084, 1090 (Fed.Cir.1998).

Evidence of copying by the accused infringer is relevant to the doctrine of equivalents analysis. *Hilton Davis Chem. Co.*, 62 F.2d at 1519. Copying suggests that the differences between the claimed invention and the accused product are objectively insubstantial. *Id.* Evidence of "designing around" the patent claims is also relevant. *Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1126 (Fed.Cir.1996). The accused infringer's subjective awareness, motive, or intent is not relevant to the equivalency determination. *Hilton Davis Chem. Co.*, 62 F.2d at 1519.

Strictly speaking, the doctrine of equivalents is inapplicable to the infringement issue because we have already determined that the accused adapter literally infringes the '531 and '855 patents. In the interests of providing a clear record, however, we will address the question of whether the accused adapter's dual chamber feed tube or probe is equivalent to the claimed feed tube or probe.

We find that Sands' testimony that Ebco's adapters infringe the asserted claims under the doctrine of equivalents is highly probative and credible. (Tr. 320-21; PTX 29). Ebco's feed tube or probe delivers water from the inverted bottle into a reservoir while admitting replacement air from the reservoir into the bottle as required by the asserted claims. Although the addition of the inner tube inside the accused adapter's feed tube or probe allows the feed tube or probe to operate more efficiently in that it reduces glugging, this addition does not avoid infringement. Ebco's feed tube performs substantially the same function in substantially the same way to produce substantially the same result as does the feed tube claimed in the asserted patents.

Moreover, the Schulse patent number 1,228,836 and the Sheets patent number 4,793,514 (PTX 237 and 163 respectively), teach separate flow paths for air and water as means to more effectively move water and air and, therefore, reduce "glugging" in water bottles. These patents issued well before Burrows began to work on the WaterGuard device for Ebco. This prior art demonstrates that two separate flow paths for air and water is at least a well-recognized equivalent to an adapter feed tube or probe having a single flow path.

Ebco further argues that Ebco's patent on a no-spill adapter having a feed tube with the inner tube addition, the Burrows 5,413,152 patent (PTX 149), is further evidence of non-equivalency. The issuance to Ebco of a patent on the accused device is irrelevant because the existence of one's own patent is no defense to infringement of another's patent. " 'It is elementary that a patent grants only the right *to exclude others* and confers no right on its holder to make, use, or sell." ' Bio-Technology Gen. Corp. v. Genentech. Inc., 80 F.3d 1553, 1559 (Fed.Cir.) (quoting Vaupel Textilmaschinen KG v. Meccanica Euro Italia SPA, 944 F.2d 870, 879 n. 4 (Fed.Cir.1991)) (emphasis supplied), *cert. denied*, 117 S.Ct. 274 (1996).

Therefore, if we had not found that Ebco's accused adapters literally infringe the asserted claims, we would find that Ebco's WaterGuard I, II and III adapters infringe the '531 and '855 patents under the doctrine of equivalents.

B. Invalidity

Ebco contends that the '531 and '855 patents are invalid because: (1) Elkay failed to name the proper inventors; (2) Elkay's invention is anticipated by a prior invention; and (3) Elkay's invention is obvious in light of the prior art. Each claim of a patent is presumed valid. 35 U.S.C. s. 282. As the party asserting invalidity, Ebco must prove by clear and convincing evidence the facts necessary to demonstrate that the '531 and '855 patents are invalid. *United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1564 (Fed.Cir.), *cert. denied*, 522 U.S. 950, 118 S.Ct. 369, 139 L.Ed.2d 287 (1997). With these standards in mind, we will address each of Ebco's contentions in turn.

1. Failure to Name Proper Inventors

First, Ebco contends that the '531 and '855 patents are invalid for failure to name the proper inventors. Specifically, Ebco asserts that Elkay failed to name Richard Fisher ("Fisher") as an inventor. Ebco also asserts that Elkay improperly named Ronald Katz and Edward Donselman as inventors because they allegedly did not contribute to the patented invention.

Under 35 U.S.C. s. 116, "[w]hen an invention is made by two or more persons jointly, they shall apply for patent jointly and each make the required oath, except as otherwise provided by this title. Inventors may apply for a patent jointly even though (1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent." Misjoinder or nonjoinder of inventors in an issued patent may be corrected if the error occurred without deceptive intent. 35 U.S.C. s. 236. Correction of a patent is improper over the objection of the named inventor unless the fact finder receives clear and convincing evidence. *Ethicon, Inc. v. United States Surgical Corp.*, 937 F.Supp. 1015, 1034 (D.Conn.1996).

Because conception is the touchstone of inventorship, *Burroughs Wellcome Co. v. Barr Lab., Inc.*, 40 F.3d 1223, 1227 (Fed.Cir.1994), *cert. denied*, 516 U.S. 1071, 116 S.Ct. 771, 133 L.Ed.2d 724 (1996), a patent must name all of the people who contribute "to the final conception of what is covered by the patent claims." *Ethicon, Inc.*, 937 F.Supp. at 1035; *see also* 35 U.S.C. s. 116. "[T]he test for conception is whether the inventor had an idea that was definite and permanent enough that one skilled in the art could understand the invention...." *Burroughs Wellcome Co.*, 40 F.3d at 1228. The idea or contribution must be specific and supply a particular solution to a problem at hand, a general goal or research plan is not enough. *Id.*; *Fiers v. Revel*, 984 F.2d 1164, 1169 (Fed.Cir.1993). A person who makes a practical and concrete suggestion that contributes to the invention is, therefore, a joint inventor. *Ethicon, Inc.*, 937 F.Supp. at 1036.

Inventorship must be shown by clear and convincing evidence. *Price v. Symsek*, 988 F.2d 1187, 1196 (Fed.Cir.1993). The inventor must describe his invention with particularity because "patent rights attach only when an idea is so far developed that the inventor can point to a definite, particular invention." *Burroughs Wellcome Co.*, 40 F.3d at 1228. Nonetheless, the inventor's testimony alone is insufficient to prove conception and must be corroborated before inventorship is demonstrated. *Price*, 988 F.2d at 1194. Written descriptions, drawings, or models are corroborating evidence if sufficient proof exists to show that they existed at the pertinent time. *Id.* at 1196.

a. Richard Fisher

Ebco asserts that Fisher made an inventive contribution to the claimed subject matter of the '531 and '855 patents. Specifically, Ebco claims that Fisher contributed the "removable mounting means" and "sealing means" used in the claimed combination. Accordingly, Ebco asserts that Fisher is a co-inventor and must be named pursuant to s. 116.

The evidence at trial established the following. In late 1984 or early 1985, the Bakers began developing a hygienic bottled water system that included a stainless steel unit supported in the reservoir by a frictional engagement that had an upstanding feed tube able to pierce a specially designed cap. (Tr. 1290-91; DTX 3). Henry Baker contacted Ebco in July 1985 to discuss the Bakers' no-spill piercer/adaptor concept. On July 31, 1985, Henry Baker met with Louis Benua, president of Ebco Manufacturing Company, Mark Blackstone, its director of marketing, and Ronald Greenwald, its chief engineer. (Tr. 1293-1294, 1324). At that time, the Bakers and Ebco signed a Confidential Disclosure Agreement whereby neither party could disclose the ideas of the other. (DTX 2). The Confidential Disclosure Agreement included a one-page written description and five pages of drawings disclosing the Bakers' concept. (DTX 3).

Fisher testified that in August 1985, Greenwald assigned Fisher to the Baker project for the specific purpose of determining if the Bakers' piercer concept could be adapted to fit Ebco's water coolers. (Tr. 1324, 1331-32). One week later, Fisher produced his first drawing which was sent to and received by the Bakers. (Tr. 1324-26; PTX 238, DTX 6). After failing to adequately develop the Baker's concept, Ebco and the Bakers severed their relationship in Fall 1987. (Tr. 894-97). In 1988, the Bakers brought their concept to Elkay. Elkay entered into an agreement with the Bakers to purchase and develop the Baker's concept. (JTX 14). Ultimately, Elkay evolved the Baker concept into the claimed invention.

At trial, Fisher used his drawing (PTX 238, DTX 6) to explain and identify the contributions that he believes he personally made to the claimed invention. Fisher testified that his adaptor is supported by the top of the cooler cabinet and that he designed a tapered entry way extending downwardly and inwardly into the reservoir so that different bottle necks could be accommodated. (Tr. 1326-28, 1337-40). Fisher also explained that he designed a tapered entry way to guide the water bottle onto the piercing probe which is molded to project upwardly from the bottom of the adaptor. (*Id.*). Fisher further testified that his adaptor includes a collar that supports the shoulder portion of the inverted water bottle so as to transmit the weight to the top of the cooler cabinet. (*Id.*). Finally, Fisher testified that shortly after Henry Baker presented his concepts to Ebco, Greenwald drew a sketch depicting the information the Bakers disclosed. (Tr. 1324). This sketch has been lost or destroyed and was not produced at trial.

We find as a matter of fact that Ebco did not provide evidence sufficient to corroborate Fisher's testimony. *See Price*, 988 F.2d at 1194. Although Fisher produced a drawing illustrating how a no-spill adaptor could

be made out of molded plastic, Fisher's drawing taken alone does not establish clearly and convincingly that Fisher conceived of the ideas depicted therein. Fisher's drawing merely confirms that Fisher put pen to paper on a date certain. The drawing does not provide any proof as to who originated the features depicted by Fisher. Moreover, other than Fischer's recollection, Ebco presented no testimony as to the existence and content of the alleged Greenwald sketch. Accordingly, we find as matter of fact that Fisher's uncorroborated testimony alone is insufficient to establish Fisher's inventive contribution.

Indeed, the evidence establishes that the Bakers actually conceived the ideas depicted in Fisher's drawing. The drawings and description attached to Confidential Disclosure Agreement (DTX 3) disclose a version of the Baker's no-spill system which includes a disc in the lower portion of the bottleneck receiving cup supported by a spring. This spring-biased disk allowing the adapter to accommodate bottles having different neck lengths. The drawings also show an inwardly tapered annular ring to support an inverted water bottle on its shoulder. These features were disclosed to Ebco by the Bakers before Fisher was even assigned to the Baker project and before Fisher produced his drawing.

Although the Bakers did not testify at trial, their deposition testimony (designations read into the record or stipulated as admitted) states that they conceived of the design elements depicted in Fisher's drawing. Furthermore, in his November 5, 1987 letter to Ebco, Henry Baker states that Ebco made no original contribution to the development of the Baker's concept. (DTX 18; H. Baker Dep., p. 138 II. 2-24). Moreover, Sands testified that, taken together, the drawings attached to the Confidential Disclosure Agreement, DTX 3, illustrate that the Bakers' no-spill concept could be modified to accommodate bottle necks having different lengths and support the bottle on its shoulder, that the Bakers' entire assembly appeared to be sitting on or in a cabinet, and that it involved a mounting means with a seal to the reservoir. (Tr. 3200-01, 3261-65). Sands' testimony in conjunction with Ebco's unexplained failure to raise Fisher's inventorship contention until May 1995, more than six years after Ebco knew that the Bakers began working with Elkay and two years after the filing of this lawsuit, weighs against Ebco position.

Finally, Henry Baker's deposition testimony states that Ebco did not propose any improvements to the Bakers' design. (H. Baker Dep., p. 93, line 21 to p. 95 line 2). Rather, John Baker stated that Fisher's drawing attempted to demonstrate how the Baker design concept and prototype adapter could be manufactured out of plastic rather than metal, a more expensive material. (J Baker Dep. 54-55, 64; Tr. 1307). At best, Fisher's contribution amounts to the use of plastic rather metal. The claims, however, do not require that the adapter be made from a particular material.

Thus, we find that the testimony of Sands and the Bakers and the documentary evidence are more persuasive than Fisher's uncorroborated testimony. Ebco has not established by clear and convincing evidence that Fisher contributed to the claimed elements of the '531 and '855 patents. Therefore, we find that Fisher is not a joint inventor and that the asserted patents are not invalid for failure to name Fisher as an inventor.

b. Edward Donselman and Ronald Katz

Ebco contends that these patents are invalid for naming Katz and Donselman as co-inventors since their purported contributions were originally made by Fisher. Katz testified that he and Donselman contributed the removable mounting means and its tapered entry portion. (Tr. 3570-73). Moreover, because we have already found that Fisher did not contribute any inventive concepts to the '531 and '855 patents, Ebco's argument does not hold water.

2. Anticipation/Lack of Invention Under s. 102(f)

Under s. 102(f), "[a] person shall be entitled to a patent unless ... he did not himself invent the subject matter sought to be patented." 35 U.S.C. s. 102(f). To prove anticipation, Ebco must prove by clear and convincing evidence that there are no differences "between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic and Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed.Cir.1991). If Ebco must rely on more than one prior art reference, anticipation cannot be demonstrated under s. 102. *Id.*; *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1267 (Fed.Cir.1991); *Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 138 (Fed.Cir.1986).

On April 15, 1988, Elkay retained Battelle Memorial Institute ("Battelle") to perform engineering work and provide detailed drawings for the Sweet Roll project, Elkay's code name for the development of its hygienic no-spill adapter. (DTX 74). Ebco claims that the drawings produced by Battelle engineers disclose every element of the subject matter claimed in the '531 and 855 patents. Accordingly, Ebco claims that the asserted patents are invalid for being anticipated by the Battelle drawings under s. 102(f).

Ebco relies solely on two drawings produced by Battelle, DTX 99, dated June 17, 1988, and DTX 100, dated June 20, 1988 (the "Battelle drawings"). This evidence, however, does not allow Ebco to meet its substantial burden under s. 102(f). The testimony of Daniel Becker, Battelle's Fed.R.Civ.P. 30(b)(6) witness and Donselman establish that Elkay and Battelle closely cooperated and exchanged ideas. (Becker Dep., pp. 56-57; Tr. 2171).

Moreover, the testimony of John Baker and Lewis Angotti, an Elkay project manager involved the "Sweet Roll" project, establishes that John Baker first conceived of the feed tube tip portion for use with a resealable cap. (J. Baker Dep., 201, 225-226; L. Angotti Dep., 119-124). Moreover, John Baker directed the preparation of a drawing depicting this concept on November 20, 1987, well before the Elkay hired Battelle and before the Battelle produced the drawings relied upon by Ebco. (DTX 37). Furthermore, Ebco's patent law expert, Christopher B. Fagan, testified that Battelle has not asserted any claim of inventorship. (Tr. 3013). The evidence did not remotely, let alone clearly and convincingly, suggest that Battelle employees conceived of each and every claim element shown in the Battelle drawings. Thus, we find that Ebco failed to present evidence sufficient to prove its claim under s. 102(f).

3. Obviousness Under s. 103

35 U.S.C. s. 103(a) provides that: "[a] patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." Ebco asserts that the '531 and '855 patents are invalid as obvious in light of the Doering 1,337,206 patent (the "Doering '206") (DTX 208), the Baker 4,699,188 patent (the "Baker '188") (DTX 1), the Liqui-Box device displayed at the October 8-10, 1987 International Bottled Water Association trade show in Chicago, Illinois, the follow-up disclosure by Liqui-Box to Elkay on January 14, 1988 (DTX 68-70, 130-139, 333, 338), and the Fisher drawing (DTX 6, PTX 238).

Patents enjoy a presumption of validity. 35 U.S.C. s. 282. Accordingly, Ebco must prove facts that clearly and convincingly show that Elkay's claimed invention would have been obvious at the time the invention

was made. Gentry Gallery, Inc., 134 F.3d at 1478. Under *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), the court must inquire into four factors to determine obviousness under s. 103: "the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the field of the invention, and any objective indicia such as commercial success, long felt need, and copying." *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 955 (Fed.Cir.1997). The record must provide a teaching, suggestion, or reason to make the engineering leap from the prior art to the asserted invention. "The absence of such suggestion to combine is dispositive in an obviousness determination." *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1578-79 (Fed.Cir.1997). In determining obviousness, the court cannot use hindsight to utilize the claims as a template and reconstruct the invention by picking and choosing elements at will from the prior art absent some teaching or suggestion supporting the combination. *Pro-Mold and Tool Co., Inc. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1572 (Fed.Cir.1996); *In re Gorman*, 933 F.2d 982, 987 (Fed.Cir.1991).

a. Level of Ordinary Skill in the Field of the Invention

Obviousness is tested by reference to "the viewpoint of a person of ordinary skill in the field of the invention." *Arkie Lures, Inc.*, 119 F.3d at 956. A person of ordinary skill in the art is a hypothetical individual who is presumed to be aware of all pertinent prior art. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed.Cir.1986), *aff'd*, 980 F.2d 742 (Fed.Cir.1992). To determine the level of ordinary skill in the art, the court may consider some or all of the following factors as applicable: "(1) the education level of the inventor; (2)[the] type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) education level of active workers in the field." *Environmental Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 697 (Fed.Cir.1983), *cert. denied*, 464 U.S. 1043, 104 S.Ct. 709, 79 L.Ed.2d 173 (1984). The determination must focus on the conditions that existed at the time the invention was made. *Arkie Lures, Inc.*, 119 F.3d at 956. Indeed, "[g]ood ideas may well appear 'obvious' after they have been disclosed, despite having been previously unrecognized." *Id.*

The Court agrees with Elkay and Ebco that the level of ordinary skill in the pertinent art is typified by an individual "having at least some technical training, probably through formal engineering courses and possibly having a bachelor's degree in engineering, together with at least several years of engineering and/or design experience involving bottled water coolers." (Statement of Undisputed Facts, para. 13.1.). This hypothetical individual would understand the basics of bottled water cooler design and the characteristics of bottled water cooler systems and component parts. Additionally, the Court finds that this person would have the ability to read and understand technical drawing and specifications. (Pre-Trial Order, para. 13.2). The obvious analysis will be conducted with reference to these determinations.

b. The Scope and Content of the Prior Art and the Differences Between the Prior Art and the Claimed Invention

The scope and content of the relevant prior art is defined as that which is "reasonably pertinent to the particular problem with which the inventor was involved." *Stratoflex Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535 (Fed.Cir.1983). Ebco "cannot pick and choose among the individual elements of assorted prior art references to recreate the claimed invention." *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 886-87 (Fed.Cir.1988). *Accord* *Kolmes v. World Fibers Corp.*, 107 F.3d 1534, 1541 (Fed.Cir.1997). The prior art must provide some reason, suggestion, or motivation whereby a person of ordinary skill in the art would make the combination that comprises the patentee's invention. *Gambro Lundia AB*, 110 F.3d at 1578-79.

The parties have stipulated that the "scope and content of the relevant prior art pertinent to the Elkay patents includes at least those products and patents related to the dispensing of liquids from bottled water containers removably mounted to a dispensing device or cabinet wherein liquid is withdrawn from the container on demand in response to the operation of a valve or faucet formed as part of the dispensing device or cabinet downstream of the container." (Statement of Undisputed. Facts, para. 12.1). Also included in the relevant prior art are: (1) bottled water coolers commercially made and sold in the United States by Elkay, Ebco, Sunroc, and others before September 23, 1988; (2) conventional water bottle caps for five gallon water bottles commercially made and sold in the United States by Blackhawk Molding Company, Cap Snap Corporation and other companies prior to September 23, 1988; and (3) five gallon water bottles commercially made and sold in the United States by Liqui-Box, Reid Plastics, and others prior to September 23, 1988. (Statement of Undisputed. Facts, para. 12.2). In addition, Ebco claims that Doering '206 and Baker '188 patents, the Liqui-Box trade show device and follow-up technological disclosure, and the Fisher drawing are within the scope and content of the prior art. We disagree.

The preambles of the independent claims of Elkay's '531 and '855 patents, recite in pertinent part, "an inverted unpressurized container having ... a substantially rigid, generally cylindrical body a coaxial cap surrounding at least an outer axial portion of said [container] neck. ('531 patent, claim 1, col. 7, ll. 59-66 and claim 7, col. 9, ll. 23-29; '855 patent, claim 1, col. 7, l. 62-col. 8, l. 1). The preambles also recite "a dischargeable reservoir open at its upper end." ('531 patent, claim 1, col. 7, l. 58 and claim 7, col. 9, l. 22; '855 patent, claim 1, col. 7, l. 61).

The preamble limitations of the '531 and '855 patents exclude the Doering '206 patent from the field of relevant prior art. As Sands pointed out, the Doering '206 patent does not have a "reservoir, open at its upper end." (Tr. 3236-37). Moreover, one of the stated objectives of the patents-in-suit is "to provide a means for retrofitting existing water cooler systems with a hygienic system." ('531 patent, col. 2, ll. 3-5; '855 patent, col.2, ll. 4-6). Doering '206 does not disclose an adapter for "retrofitting" an existing water cooler system. Rather, Doering '206 teaches a closed system, without an open reservoir that resembles a pressure water cooler. (Tr. 3476). Furthermore, Doering '206 does not contain a removable mounting means and, thus, it has no need for the "sealing means carried by said removable mounting means for sealingly closing said open upper end of said reservoir" as recited in the body of claim 1 of the '531 and '855 patents.

In addition, the 77 year-old Doering '206 patent employs a rubber stopper rather than a coaxial cap with an axially extending skirt portion as required by the preambles of the asserted claims. The Doering '206 also teaches that the flow of air through the feed tube is controlled by a valve. An examination of Figure 4 of the Doering '206 patent shows that valve 4 normally obstructs the flow of replacement air through line 46 into the closed reservoir and then up through the feed tube. Claim 7 of the '531 patent, however, discloses a feed tube unobstructed by external valving. Thus, Doering '206 contains differences from the claimed invention that take the Doering '206 outside the scope of the relevant prior art.

Most damaging to Ebco's obviousness claim is the use of the Liqui-Box trade show device as support for its obviousness claim. Ebco asserts that Liqui-Box displayed a device at the October 1987 International Bottle Water Association trade show that is prior art rendering the asserted patents invalid. At trial, Ebco submitted a video tape from that trade show and a December 1987 Liqui-Box marketing video tape. (DTX 130, 131) In addition, still photographs from these tapes were also admitted. (DTX 132-139). These tapes and the still photographs are blurry and offer only fleeting views of the Liqui-Box trade show device. The actual trade show device itself was scrapped after the show. Based on the inadequacies of the video tape, Ebco's counsel

prepared and submitted DTX 338-1 to 338-4 and DTX 401-1 to 402-15 and as "representative" depictions of the trade show device. In addition, Exhibit 333, a replica of that device, was created for trial without aid of Liqui-Box's original drawings. (Tr. 1507, 1525).

The testimony at trial, however, demonstrates that these "representative" exhibits do not accurately depict the structure shown at the trade show and, therefore, are of no probative value. John Ulm ("Ulm"), a retired manufacturing and management engineer for Liqui-Box and coinventor of the Bond 4,421,146 (the "Bond '146) and 4,445,551 (the "Bond '551) patents, testified that DTX 333 and 338 show a seal between the device and the round reservoir even though the actual trade show device did not have the seal. (Tr. 1507, 1530). Moreover, Ulm testified that Ebco's "representative" device is not dimensionally accurate and that Ebco's "representative" drawings are not drawn to scale. (Tr. 1530-31). Ulm also stated that, unlike Ebco's trial exhibits, the trade show device was not mounted on a water cooler. (Tr. 1507). Additionally, Ebco's drawings depict a chamfer in the "entry portion" at the top of the cylinder which received the bottle neck. The actual trade show device, however, had a radius, as depicted in the Ulm 4,874,023 patent (the "Ulm '023"). (Tr. 1532-33; DTX 207). Most telling, however, are the statements of Ebco's trial counsel admitting that the actual Liqui-Box trade show device differed from the exhibits, *e.g.* Tr. 1692, 1694, and the admission by Ulm stated that the "representative" drawings were only "partially" accurate. (Tr. 1524-25). Accordingly, we decline to afford any weight to the Liqui-Box trade show device and find that it is not relevant prior art.

Furthermore, the January 1988 Liqui-Box technology disclosure is not relevant prior art. In January 1988, Ulm met with Donselman at Elkay. Donselman testified that he drew DTX 68 after the meeting. Ebco claims that this drawing in conjunction with the Liqui-Box trade show device meets virtually every limitation recited in the patents-in-suit. The evidence, however, belies Ebco's assertion.

Ulm testified that he shared "some samples of the cap and I don't know-and I am sure we took some kind of a probe along, but we did not take a cover." (Tr. 1510-11; *accord* Tr. 1533-34). Donselman recalled seeing a probe and a cap, but could not recall which, if any, of the other design features shown in his drawings may have been disclosed by Ulm. (Tr. 2128-30). Donselman further testified that his drawing did not accurately depict the information disclosed by Liqui-Box and that it shows Donselman's own modifications "pertaining to making a Water Safe system out of it." (Tr. 2124, 2128-30). This evidence does not clearly and convincingly establish that Ulm or Liqui-Box contributed any of the design elements depicted in Donselman's drawing.

Moreover, the preamble language, and the specific container and cap recitations therein, exclude bag-in-the-box containers, such as Liqui-Box's product, and couplers from the relevant field of the prior art. Bag-in-the-box type containers comprise a flexible bag fitted into a cardboard box, rather than a substantially rigid body as required by the asserted claims. The Liqui-Box quick-connect-disconnect, or QCD connectors, shown in the Bond '551 and Bond '146 patents (DTX 23, 24) do not include "a coaxial cap surrounding at least one outer axial portion of [a container] neck" as required by the preambles. Indeed, Ebco's technical expert admitted that the Savage 32,354 patent (the "Savage '354") (DTX 26), cited by Elkay during the prosecution of the '531 and '855 patents, provides a preferred solution to the problem of accepting bottles with different neck lengths. (Tr.2004, 2061-62).

Lastly, because we found that the Bakers actually conceived of the ideas depicted in the Fisher drawing, *see supra* s. III, B, 1, a, the Fisher drawing is not relevant prior art.

To support its claim the the prior art in combination renders the '531 and '855 patents obvious, Ebco presented Roger A. Keech, a full professor of engineering at Cal Poly State University. Professor Keech teaches upper level engineering science classes and is himself a licensed professional engineer. Prior to being hired as an expert in the instant lawsuit, Professor Keech had no experience with bottled water coolers, no-spill devices, or bag-in-the-box dispensers such as those manufactured and sold by Liqui-Box. (Tr. 1644-50, 1915-166; Pre-Trial Order, Exhibit 2E, Keech Resume; July 21, 1997 Order).

Using the same computer equipment as Sands and referencing the relevant language in the patents-in-suit, Professor Keech combined elements from the Doering '206 and Baker '188 patents, the Liqui-Box trade show device and related technological disclosures, the Fisher drawing and other relevant prior art, such as the Savage '354 patent, to support his testimony. In addition, Professor Keech color-coded the prior art asserted by Ebco to the relevant portions of the patents-in-suit. (DTX 340-345) Ultimately, Professor Keech concluded that his prior art combinations fully meet the claim language found in each and every one of the asserted Elkay patents.

Although Keech is qualified as an expert in the area of design and mechanical engineering, Tr. 1650, 1652, his lack of experience in the subject matter of the patents in suit, other than what he learned as an expert in the instant lawsuit, significantly affects the weight afforded to his testimony. Moreover, professor Keech admitted that his expert report (DTX 321) contains no illustrations and that he did not prepare the trial exhibits illustrating the prior art combinations presented by Ebco. (Tr.1925-29, 1931, 1934; DTX 334-338, 399-402). Equally telling is Professor Keech's admission that he did not make the decision as to how much of the Doering '206 patent should be shown in the combination depicted in DTX 334, drawing 5. (Tr.1934). Professor Keech's assertion that "he made every one of those combinations" and described the combinations with words in his report, Tr.1933-34, does not overcome that fact that he did not participate in the preparation of the exhibits forming the basis of his conclusions.

The drawings utilized by Professor Keech to illustrate his testimony pick and choose various elements from the prior art and combine those elements with the goal of achieving the claimed invention. Hindsight reconstructions, however, are not evidence of obviousness. *See Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1575 n. 30 (Fed.Cir.1987). The use of sketches reconstructing the prior art, which insert as elements of a claim parts selected from separate patents so that Professor Keech could find each of those inserted elements in that sketch and then submit the sketch as evidence, necessarily involve the exercise of hindsight. *See Id.* Moreover, "[v]irtually all inventions are necessarily combinations of old elements. The notion, therefore, that combination claims can be declared invalid merely upon finding similar elements in separate prior patents would necessarily destroy virtually all patents and cannot be the law under the statute, s. 103 ." *Id.* at 1575. Accordingly, we find that Keech's opinions and accompanying illustrations are not persuasive and are impermissibly based on hindsight. *E.g. Heidelberger Druckmaschinen AG v. Hantscho Commercial Prod., Inc.*, 21 F.3d 1068, 1072 (Fed.Cir.1994).

Notwithstanding our finding that the prior art asserted by Ebco is not relevant, we find that nothing in this prior art, other than impermissible hindsight, would have lead a person of ordinary skill in the art in 1987 or 1988 to combine the prior art references cited by Ebco to achieve the inventions claimed by the '531 and '855 patents. Thus, Ebco's obviousness case "suffers from a significant deficiency." *See Gambro Lundia AB*, 110 F.3d at 1579.

c. Secondary Considerations

Under *Graham*, 383 U.S. at 35-36, secondary considerations, such as commercial success, skepticism of skilled artisans, long felt need, copying, licensing of the invention, and failure of others to achieve the invention are relevant to the obviousness inquiry. *Arkie Lures, Inc.*, 119 F.3d at 957; *Minnesota Mining and Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1573 (Fed.Cir.1992). These secondary considerations are highly probative of obviousness, but are not necessarily entitled to more weight than the other three *Graham* factors. *Arkie Lures, Inc.*, 119 F.3d at 957; *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed.Cir.1997). Nonetheless, "evidence of secondary considerations may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not. It is to be considered as part of all the evidence, not just when the decision maker remains in doubt after reviewing the art." *Arkie Lures, Inc.*, 119 F.3d at 957 (citing *Stratoflex, Inc.*, 713 F.2d at 1538-39).

i. Failure of Others

Ebco's own history with the Bakers belies its obviousness contention. Initially, in 1985, the Baker's brought their concept to Ebco. Ebco attempted to develop the Baker's piercing technology for two full years, utilizing Fisher and another engineer, but ultimately Ebco could not produce a workable piercer adapter. (Tr. 559, 1358, 1410). As a result, the Baker-Ebco relationship was severed in late 1987. (Tr. 894-97). Subsequently, the Bakers began working with Elkay and Elkay bridged the gap between the Baker concept and the claimed invention.

During this same general time period, Liqui-Box began working on its DeCap adapter, a no-spill device used exclusively with Liqui-Box products. (Tr. 1003, 1006). As of mid-1989, Liqui-Box had not successfully adapted this technology to bottled water coolers. Liqui-Box and Ebco then began working together to further develop the develop DeCap adapter for use on bottled water coolers. (Tr. 924-28, 1550-54; PTX 122). The combined Ebco-Liqui-Box efforts failed, and Liqui-Box attempted to complete the development of its DeCap adapter on its own. (PTX 143).

Elkay displayed its prototype Water Safe system at the October 1988 International Bottled Water Association trade show. Subsequently, Liqui-Box revised its version of the DeCap system and began to market that new system. Ebco offered the revised DeCap system to its customers during 1989-1990. After Ebco failed to sell a single DeCap adapter, Ebco stopped offering the product. (Tr. 892). Liqui-Box sold approximately 10,000 DeCap adapters to Great Pines Water Company. (Tr. 1144-45). Ultimately, however, the DeCap adapter was a commercial failure and Liqui-Box suffered a \$2.1 million judgment due to the leakage of water from the DeCap adapter. (Tr. 1087-88; PTX 219).

The failures of Ebco and Liqui-Box to develop and commercialize a device possessing all of the features provided by the claimed invention comprise significant probative evidence that the claimed invention is not obvious in light of the prior art. "Indeed, the litigation argument that an innovation is really quite ordinary carries diminished weight when offered by those who had tried and failed to solve the same problem, and then promptly adopted the solution that they are now denigrating." *Heidelberger Druckmaschinen*, 21 F.3d 1068 at 1072.

ii. Long Felt Need

Bottled water coolers have long suffered from spillage and hygiene problems. Well before the conception of the Elkay invention, others such as the Bakers, Ebco, and Liqui-Box attempted to make a device that delivered water in a hygienic manner and that allowed for easier loading and unloading of full or partially

full water bottles. In the mid-1980's, bottled water industry representatives and government regulators began to review water purity standards. The motivation to develop a more hygienic bottled water delivery system increased with the passage of the Safe Drinking Water Act Amendments of 1986, 42 U.S.C. s. 300f *et seq.* (Tr. 561-62). Thus, prior to 1988 when Elkay introduced its patented invention, the bottled water industry wanted a system that provided the advantages and features offered by Elkay's patented invention.

iii. Commercial Success

To show commercial success, Elkay must demonstrate a nexus between the proven success and the patented invention. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed.Cir.), *cert. denied*, 488 U.S. 956, 109 S.Ct. 395, 102 L.Ed.2d 383 (1988). Once Elkay satisfies its burden, Ebco must present evidence demonstrating that the commercial success is attributable to extraneous factors other than the patented invention, such as advertising or superior workmanship. *Id.* at 1393.

Elkay presented substantial evidence that the inventions described in the '531 and '855 patents are commercially successful. (*E.g.* Tr. 107-09, 322, 356; PTX 87-92A, 126, PDX 408, 410, 414, 414A). Moreover, several smaller bottlers such as Daniel Buettner, a marketing and salesman at Water and Accessories, James Keene president of Mountain Mist Bottled Water, and Steve Carroll, owner of Northwest Georgia Mountain Water, testified that the Ebco and Elkay no-spill devices positively affected sales and rentals and enabled them to take business away from the larger bottlers who offered only open reservoir coolers. (Tr. 2721-22, 2726, 2730, 3437-40, 3449, 3452-53). Steve Carroll also stated that he advertised the no-spill feature in his company's Yellow Page advertising. (Tr. 2726). Accordingly, the Court concludes that Elkay demonstrated the commercial success of the claimed invention.

Elkay also proved a nexus between the invention and the commercial success in that customers and smaller bottlers reap the benefits of the no-spill adapter. Indeed, the testimony of the smaller bottlers shows that the features and advantages provided by the Water Safe and infringing WaterGuard adapters had a positive impact on sales and water cooler rentals. The commercial success of Elkay's patented invention therefore, weigh in favor of nonobviousness.

iv. Copying

The copying of another's invention provides additional evidence of nonobviousness. *Avia Group Int'l, Inc. v. L.A. Gear Cal., Inc.*, 853 F.2d 1557, 1564 (Fed.Cir.1988). In Spring 1990, Ebco and Bruce Burroughs/Hydrotechnology, Inc. signed an agreement to form Ebtech. (JTX 10). Elkay introduced its Water Safe system on a commercial scale in the last half of 1990. (Tr. 55). After the failure of the Liqui-Box DeCap system, Ebco had no product to compete with Elkay's Water Safe. In Fall 1990, Perrier Group of America ("Perrier"), the largest bottled water company operating in the United States, approached Ebco to discuss the possibility of enhancing the Liqui-Box DeCap device so that it could be used with non-Liqui-Box products. (Tr. 890-91, 1000-04). After that failed to develop, Burrows constructed a working WaterGuard device and demonstrated it at the October 1991 International Bottled Water Association trade show. (Tr. 3551). Burrows testified that he saw a Water Safe system before he started designing the WaterGuard. (Tr. 1152-53).

The evidence establishes that, not only did Ebco copy the patented invention, but that a significant percentage of its water coolers are now sold with a no-spill adapter. Thus, competitor copying of the asserted invention constitutes substantial evidence of nonobviousness.

d. Resolution of the Obviousness Issue

After careful and through consideration of the evidence with regard to the *Graham* factors, we find that Elkay has not demonstrated obviousness by clear and convincing evidence. The differences between the asserted claims and the prior art provide strong evidence of nonobviousness. Moreover, the relevant prior art contains no teaching, suggestion, or motivation to employ the claimed combination in the manner disclosed by the '531 and '855 patents.

C. Unenforceability Due to Inequitable Conduct

Ebco also contends that the '531 and '855 patents are unenforceable because Elkay engaged in inequitable conduct by intentionally failing to disclose material prior art to the Patent and Trademark Office during the patent prosecution process. Elkay asserts that the withheld prior art is not material and is cumulative. For the following reasons, we find that Ebco failed to present clear and convincing evidence of inequitable conduct.

"Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the [Patent and Trademark] Office, which includes a duty to disclose to the [Patent and Trademark] Office all information known to that individual to be material to patentability...." 37 C.F.R. s. 1.56(a). The patentee has no duty to submit information that is not material to the patentability of any existing claim. 37 C.F.R. s. 1.56(a). Moreover, the patent applicant need not disclose otherwise material prior art if that art is merely cumulative or less material than the prior art already before the Examiner. *Halliburton Co. v. Schlumberger Tech. Corp.*, 925 F.2d 1435, 1441 (Fed.Cir.1991).

The duty of candor and good faith is not a legal fiction and has long been an essential part of the patent process. *Precision Instrument Mfg. Co. v. Automotive Maintenance Mach. Co.*, 324 U.S. 806, 818, 65 S.Ct. 993, 89 L.Ed. 1381 (1945). If proved, inequitable conduct renders the entire patent unenforceable not just the claims to which the inequitable conduct has been directed. *Molins PLC v. Textron, Inc.*, 1173, 1178 (Fed.Cir.1995).

"Inequitable conduct consists of an 'affirmative misrepresentation of a material fact, failure to disclose material information or submission of false material information, coupled with an intent to deceive.'" *Kolmes*, 107 F.3d at 1541 (citing *Molins PLC*, 48 F.3d at 1178). Specifically, Ebco must establish by clear and convincing evidence that: (1) the withheld prior art is material, (2) the patent applicant knew of this prior art and its materiality, and (3) the failure to disclose the prior art resulted from an intent to deceive or mislead the Patent and Trademark Office. *Molins*, 48 F.3d at 1178. "A reference which merely replicates references already before the examiner, however, is not material." *Gambro Lundia AB*, 110 F.3d at 1580. *See also* 37 C.F.R. s. 1.56(b)(2)(ii). If Ebco satisfies its burden of proof, the court must weigh any threshold finding of materiality and intent in light of all the circumstances, including evidence of good faith, to determine whether they warrant a conclusion that inequitable conduct occurred. *Gambo Lundia AB*, 110 F.3d at 1580.

In support of its inequitable conduct defense, Ebco presented Christopher B. Fagan ("Fagan"), a patent attorney with more than 25 years of trial practice experience. Although Fagan is a knowledgeable patent attorney, his employment experience at the Patent and Trademark Office is limited to serving as a patent examiner while in law school. In response, Elkay presented Rene D. Tegtmeyer ("Tegtmeyer"). Tegtmeyer has extensive experience at the Patent and Trademark Office. He was the Assistant Commissioner for Patents from 1975-1989, the Acting Commissioner of Patents from 1973-1974, and a Patent Examiner from 1959-1964. Tegtmeyer worked at the Patent and Trademark Office for a significant time period and is,

therefore, intimately familiar its practices, including the type of issues in the instant lawsuit. Thus, the Court finds Tegtmeyer substantially more credible and persuasive than Fagan.

Ebco's Unenforcability arguments focus on the language of claim 7 of the '531 patent which refers to the hollow feed tube which has no internal or external valve or other obstruction. This claim states "said fluid passage means being unobstructed by internally or externally disposed valving to permit the free flow of liquid and air therethrough." ('531 patent, claim 7, col. 10, ll. 24-26). Elkay argued to the Examiner that the Bond '146, Ulm '023, and Savage '354 patents were the most pertinent prior art because, unlike Elkay's invention, these references showed valves obstructing the feed tubes. Ultimately, the Examiner allowed claim 7 because "the prior record does not teach a ... feed tube as claimed wherein the feed tube has a passage means which both dispenses liquid from the container into the reservoir and admits air from the reservoir into the container." (JTX 1, Paper No. 7, p. 2). The Examiner further noted that in the Krug reference cited by Elkay, "feed tube 13 does not provide a means for admitting air." (Id).

Now, Ebco asserts that Elkay's patent counsel could not have presented arguments to the Examiner in support of the claim 7 language had Elkay cited certain prior art purportedly known to Elkay at that time. Specifically, Ebco claims that Elkay intentionally withheld the Doering '206 and the Bond '551 patents from the Examiner. Ebco contends that these patents teach a valveless feed tube or probe. Ebco also claims that the Liqui-Box Patent Cooperation Treaty foreign patent application and technology is material prior art improperly withheld by Elkay.

Fagan testified that the Doering '206 patent completely discloses the combination of elements that the Examiner stated were not present in prior art that he specifically relied upon when he allowed claim 7 of the '531 patent. (Tr. 2438, 2483, 2495-96, 3727). Fagan opined that the "withheld" Doering '206 and Bond '551 patents each disclose a valveless feed tube or probe. (E.g. Tr. 2405-06, 2420-24). Fagan however, failed to recognize that the feed tube of Doering '206 and the feed tube of Bond '551 do not teach a fluid passage means "unobstructed by *externally* or *internally* disposed valving" as required by claim 7 of the '531 patent. In Doering '206, the free flow of air through the feed tube is normally *obstructed* by external valving 40. Similarly, the free flow of liquid through the Bond '551 probe is normally *obstructed* by external valve 71.

Fagan also relied on Bond '551, figures 10 and 11, and the valveless feed tube of Doering '206 depicted in figures 7 and 8. Fagan opined that these figures demonstrate that Bond '551 and Doering '206 are highly material because they show feed tubes without internal valves. The figures cited by Fagan, however, are truncated depictions of the feed tube or probe. An examination of figures depicting the entire feed tube or probe undercut Fagan's conclusion.

Figure 12 of the Bond '551 patent shows the entire feed tube and it is obstructed by external valving. Likewise, figures 1 and 4 of Doering '206 depict external valving which blocks the flow of replacement air through the feed tube. Figures 1 and 4 also show that the fluid passage means for the flow of air through feed tube 23 includes an air tube 46 whose open end 39 is normally blocked by valve 40. When the handle 43 is pressed down to draw water from the vessel or chamber 25, valve 40 is moved away from the open end of the air tube 46 so as to permit the flow of air therethrough. Thus, Fagan's conclusion that Doering '206 and Bond '551 disclose feed tubes or probes unobstructed by valving is not correct.

Moreover, the prior art references cited to and considered by the Examiner disclose external valving. See Krug 2,057, 238 (DTX 193) external valve 16 and Kienlein 4,523,698 (PTX 201) external valve 22. Because Doering '206 and Bond '551 teach a feed tube or probe obstructed by a valve, these references are no more

appropriate or pertinent than the prior art considered by the Examiner. In addition, Tegtmeier testified that the withheld references were merely cumulative. (Tr. 3385-86). Tegtmeier further stated that a patent applicant generally tries to avoid "dumping too much on the examiner" and that if a list of prior art references was very long, he would cull them down. (Tr. 3387).

We find Tegtmeier's testimony credible and convincing. The references cited by Fagan are cumulative examples of feed tubes or probes with obstructed fluid passage means. Thus, we do not find credible Fagan's conclusion that, "I think that's highly significant that the Examiner's reason for allowance of these claims hinged on his having to rely on Krug as the best reference he could find when he didn't have Doering." (Tr. 2495-96 OR 2498). Furthermore, the Liqui-Box Patent Cooperation Treaty foreign application (DTX 189) does not make Fagan's testimony any more persuasive. This application discloses nothing more than what is disclosed in the figures in the Bond '146 patent, cited by Elkay to the Examiner, and the Bond '551 patent disclosed above and, therefore it is cumulative. Accordingly, we find that Ebco has failed to demonstrate that the uncited art was material.

Using hindsight, it is not difficult to find items that could have been brought to the Examiner's attention. It is much more difficult, however, to prove that a patent applicant intentionally misled the Examiner by failing to disclose material information. Because we found that the withheld art was merely cumulative, we need not address Ebco's claim that Elkay or its patent counsel intentionally and knowingly withheld material prior art from the Examiner. For all of the foregoing reasons, we find that Ebco has not met its burden to prove by clear and convincing evidence that Elkay engaged in inequitable conduct.

D. Damages

"Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court." 35 U.S.C. s. 284. The claimant, must prove the actual of actual damages by a preponderance of the evidence. *Minco, Inc. v. Combustion Eng'g Inc.*, 95 F.3d 1109, 1118 (Fed.Cir.1996); *Hebert v. Lisle Corp.*, 99 F.3d 1109, 1119 (Fed.Cir.1996).

Compensatory damages are measured by the amount that would place the patentee in the position in which it would have been absent the infringement. Compensatory damages may be determined by three methods: (1) lost profits; (2) an established royalty; or (3) a reasonable royalty. Lost profits assess the actual damages suffered by the patentee. *Trell v. Marlee Elec. Corp.*, 912 F.2d 1443, 1445 (Fed.Cir.1990). A reasonable royalty is intended to provide "a just recovery to persons who for evidentiary or other reasons cannot prove lost profits or an established royalty." ' *Hayhurst v. Rosen*, No. CV-91-4496, 1992 WL 123178,* 13 (E.D.N.Y. Sept. 8, 1992). The damages award may be split between lost profits, to the extent proven, and a reasonable royalty. *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1577 (Fed.Cir.1989), *cert. denied*, 493 U.S. 1022, 110 S.Ct. 725, 107 L.Ed.2d 744 (1990).

The amount of damages is a question of fact. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 926 F.2d 1161, 1164 n. 2 (Fed.Cir.1991). Although an award cannot be totally speculative, "the amount need not be proven with unerring precision." *Standard Haven Prod., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1374 (Fed.Cir.1991), *cert. denied*, 506 U.S. 817, 113 S.Ct. 60, 121 L.Ed.2d 28 (1992). "Any doubts regarding the calculatory precision of the damage amount must be resolved against the infringer." *Kaufman Co., Inc. v. Lantech, Inc.*, 926 F.2d 1136, 1142 (Fed.Cir.1991). *Accord Minco Inc.*, 95 F.3d at 1118.

The parties have agreed that the applicable period for the damages calculation is August 20, 1993 to the present. (Statement of Undisputed facts, para. 16.1).

1. Reasonable Royalty

Elkay claims a reasonable royalty of \$1.50 for each infringing adapter sold by Ebco. Ebco argues that a reasonable royalty is actually 40(cents) to 50(cents).

A reasonable royalty is measured by a hypothetical arm's length negotiation between a willing licensor and a willing licensee just prior to the time the infringement began. *Unisplay S.A. v. American Elec. Sign Co.*, 69 F.3d 512, 517 (Fed.Cir.1995). In determining the amount of the reasonable royalty, the fact finder may consider the factors set out in the seminal case *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F.Supp. 1116 (S.D.N.Y.1970), *modified on other grounds*, 446 F.2d 295 (Fed.Cir.), *cert. denied*, 404 U.S. 870, 92 S.Ct. 105, 30 L.Ed.2d 114 (1971). *SmithKline Diagnostics, Inc.*, 926 F.2d at 1168. The fifteen *Georgia-Pacific* factors are:

(1) The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty. (2) The rates paid by the licensee for the use of other patents comparable to the patent in suit. (3) The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold. (4) The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly. (5) The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter. (6) The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or conveyed sales. (7) The duration of the patent and the term of the license. (8) The established profitability of the product made under the patent; its commercial success; and its current popularity. (9) The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results. (10) The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention. (11) The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use. (12) The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions. (13) The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer. (14) The opinion testimony of qualified experts. (15) The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

Georgia-Pacific Corp., 318 F.Supp. at 1120. This exhaustive list contains factors which may not be relevant considerations for every hypothetical negotiation. *See e.g.*, *Gargoyles, Inc. v. United States*, 113 F.3d 1572, 1579 (Fed.Cir.1997); *Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1109-1110 (Fed.Cir.1996), *cert. denied*, 520

U.S. 1115, 117 S.Ct. 1244, 137 L.Ed.2d 327 (1997). The determination of a reasonable royalty is an issue of fact. *SmithKline Diagnostics, Inc.*, 926 F.2d at 1164.

At trial, Elkay's damages expert, Raymond Sims ("Sims"), vice president of the economics group at A.T. Kearney, Inc., provided an in-depth analysis of the applicable *Georgia-Pacific* factors. (PTX 33). Sims concluded that Elkay should receive from Ebco a minimum royalty of \$1.50 per infringing WaterGuard adapter sold. (Tr. 583, 3614-15). Ebco's financial expert, Jeffrey H. Kinrich ("Kinrich"), a Price Waterhouse LLP partner specializing in dispute analysis and corporate recovery, opined that the reasonable royalty rate is 4.2% of the sales price of the adapter or approximately 40(cents)-50(cents). (Tr. 2838-56, 2937; *e.g.* DTX 361R, 362R, 388R). We find the testimony of Sims more credible and entitled to greater weight than the opinions offered by Kinrich.

We have already determined that the patented technology is commercially successful. *See supra* section III, B, 3, c, iii. Nonetheless, the best evidence of the value of Elkay's patented technology is the market price a willing buyer will pay. Three Elkay licenses are most probative of this determination.

The first relevant agreement is the 1988 agreement between Elkay and the Bakers. (JTX 14). Under this agreement, Elkay purchased the Baker's technology which Elkay then developed into the claimed invention. (Tr. 590-91). Elkay paid the Bakers an initial payment of \$50,000, two additional \$50,000 payments, and an ongoing royalty of 4.5% of the selling price of each Water Safe system ultimately manufactured. If Elkay entered into a sub-license agreement, the Bakers would receive the greater of 50% of net royalty fees or net income or the 4.5% royalty otherwise due. (Tr. 590-91; JTX 14). Regardless of the terms of any license or sublicense agreement, Elkay would still have to pay the Bakers a minimum of 4.5% of the selling price of each patented device sold. (Tr. 591). Accordingly, we agree with Sims' conclusion that the Baker agreement set a minimum for the hypothetical Elkay-Ebco licence. (Tr. 591-92).

In November 1995, Elkay licensed its patented technology to Marvel Tek Napco ("MTN"), which markets thermoelectric counter top coolers and crock-type water dispensers. (PTX 100). Under the agreement, Elkay purchased a one-third interest in MTN. At that time, Elkay had essentially no presence in the counter top and crock-type cooler market. Based on Elkay's option to purchase the remaining two-thirds interest in MTN, Elkay initially allowed MTN to develop and use the Water Safe technology at no charge. (Tr. 593-94). If Elkay purchased the rest of MTN, a royalty would be unnecessary. If Elkay did not exercise its purchase option, MTN would pay a licensing fee and a royalty of at least \$1.00 per Water Safe sold. (Tr. 594-95, 3616-17; PTX 100). Ultimately, Elkay choose to acquire one hundred percent of MTN. (Tr. 594, 3618).

In September 1996, Elkay also entered into a licensing agreement with Industria Brasileira de Bebedouras Ltda. ("IBBL"), a Brazilian water cooler manufacturer and distributor. Under the agreement, PTX 102A, IBBL agreed to pay a royalty of \$1.50 per no-spill hygienic unit manufactured. In addition, IBBL agreed to buy and distribute a specified quantity of high-end Elkay coolers. (Tr. 595-96; PTX 102A). IBBL could use and sell Elkay's technology only in Brazil. (Tr. 595-96).

Although not exactly analogous, the Baker, MTN, and IBBL agreements are highly probative of a hypothetical Elkay-Ebco licensing agreement. Kinrich's complete rejection of the relevance of the agreements, Tr. 2840, 2849, 2931-35, is not credible.

The Bakers, MTN, and IBBL do not compete with Elkay and, therefore, the licensing agreements pose no

risk to of lost sales to Elkay. Indeed, in addition to monetary incentives, Elkay reaped other benefits from the licencing agreements. The Baker agreement allowed Elkay to develop the technology in the asserted patents. The MTN and IBBL agreements allowed Elkay to enter a new geographic market (IBBL) and a new product market (MTN). (Tr. 3618). Based on Ebco's undisputed position as a direct competitor of Elkay, Elkay would risk lost sales through the hypothetical licensing agreement. Accordingly, we agree with Sims that an Elkay-Ebco license would be at a higher rate than the Baker, IBBL, or MTN licensing fees. (Tr. 590-96, 602-03, 3620). Even so, we will not engage in undue speculation and decline to affix a royalty rate higher than \$1.50, the highest specified royalty paid to Elkay. Accordingly, based on the evidence presented, we find that the reasonable royalty is \$1.50.

2. Lost Profits on Water Coolers

In addition to the reasonable royalty, Elkay claims that, but for Ebco's infringement, Elkay would have sold more water coolers because it was the only water cooler manufacturer offering a solution to the spilling and hygiene problems, namely the Water Safe no-spill adapters. As support, Elkay contends that adapters drive the sales of water coolers. Ebco asserts that Elkay failed to establish that no-spill adapters have any effect on cooler sales and, therefore, Elkay is not entitled to lost profits on any water coolers sold by Ebco.

To recover lost profits, the patentee show a "reasonable probability" that, but for the infringement, the patentee would have made the infringer's sales. *Minco, Inc.*, 95 F.3d at 1118; *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1538, 1545 (Fed.Cir.), *cert. denied*, 516 U.S. 867, 116 S.Ct. 184, 133 L.Ed.2d 122 (1995).

Under the well recognized four factor test first articulated in *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1156 (Fed.Cir.1978), the patentee must establish: (1) demand for the patented product; (2) absence of acceptable non-infringing substitutes; (3) manufacturing and marketing capability to exploit the demand; and (4) the amount of profit it would have made. *Rite-Hite Corp.*, 56 F.3d at 1545. This test is a "useful but non-exclusive way for a patentee to prove entitlement to lost profits damages." *Id.* The *Panduit* test allows the court to reasonably infer that the claimed lost profits were actually caused by the infringing sales thereby establishing the "but for" causation required for the patentee's prima facie case. *Id.*; *Kaufman Co.*, 926 F.2d at 1141. When the patentee satisfies the *Panduit* test, it sustains the burden of proving entitlement to lost profits due to the infringing sales. *Id.* The burden then shifts to the infringer to demonstrate that the inference is unreasonable for some or all of the claimed lost sales.

The loss of profits is not presumed to result automatically from infringing sales. Nevertheless, the satisfaction of all four *Panduit* requirements allows the court to reasonably infer that the patentee would have made the sale but for the infringement. *Kaufman Co., Inc.*, 926 F.2d at 1141. If the patentee and the infringer are the only suppliers present in the market, it is reasonable to infer that the infringement probably caused the loss of profits. *Id.*

a. Demand

A substantial number of sales of infringing products is compelling evidence of demand for a product. *Gyromat Corp. v. Champion Spark Plug Co.*, 735 F.2d 549, 552 (Fed.Cir.1984). Ebco introduced the infringing WaterGuard adapters on a commercial scale in 1992. Ebco sold 591, 192 WaterGuard systems from August 23, 1993 through July 31, 1995. From January 1, 1994 through July 31, 1995, Ebco sold 66,253 bottled water coolers with a WaterGuard unit attached prior to shipment. (Statement of Undisputed Facts, para. 17.2-17.3). In addition, the evidence at trial demonstrates that both Ebco and Elkay experienced notable sales increases in each of the years following the introduction of the no-spill adapter. (*E.g.* . Tr.

108-09, 567; PDX 239, 383, 408, 410, 414A, DTX 320). Accordingly, we find that Elkay has established a demand for adapters containing the patented features during the relevant time frame.

b. Absence of Acceptable Non-Infringing Substitutes

At trial, Elkay sufficiently established the absence of non-infringing substitutes during the damages period. Any Ebco WaterGuard adapter offered by other suppliers such as Sunroc, are by definition an infringing products. (Tr. 114). Moreover, in 1995, Kel-Jac Engineering and Plastics Sales, Incorporated ("Kel-Jac"), in conjunction with Perrier developed and tested a no-spill device. Although the Kel-Jac adapter was a no-spill system, it did not offer the contamination resistance feature of Elkay's sealed hygienic system. After Perrier decided not to use the Kel-Jac adapter, Kel-Jac sold a small number of adapters and then ceased sales due to the possibility of infringement liability. (Tr. 3138-39). Ebac, Limited, located in the United Kingdom, sells extremely limited quantities of no-spill devices in the United States, but it has no discernable market presence here. (Tr. 3140-41). Two Canadian companies, Crystal Mountain Water Coolers and Thermo Concepts, Inc., also manufacture no-spill hygienic systems for bottled water coolers. These companies, however, have no substantial presence in the United States and Elkay has already notified these companies that their products infringe Elkay's patents. (Tr. 114-115). Finally, Liqui-Box's limited sales of its DeCap no-spill product occurred before the damages period. Moreover, the DeCap product was a commercial failure and, thus, an unacceptable substitute. (Tr. 530, 1087-88, 1144-46; PTX 219). Accordingly, we find as a matter of fact that the alternatives available during the damages period either infringed Elkay's patents or were not readily or commercially available in the United States. Thus, Elkay has established the absence of noninfringing alternatives.

c. Manufacturing and Marketing Capacity

Elkay also proved that it had existing or potential manufacturing and marketing capacity to exploit the product demand satisfied by Ebco from August 1993 to the present. Dennis Scully ("Scully"), president of Elkay's Cordley-Temprite Division, testified that Elkay had the capacity to produce more than 300,000 Water Safe units per year. (Tr. 506-07). He also stated that Elkay's feed tube supplier, Guttenberg Industries, could manufacture 324,000 plastic feed tubes annually. (Tr. 507). In addition, should Elkay need additional feed tubes, it could create duplicate tooling and produce an additional 324,000 plastic feed tubes or 156,000 stainless steel feed tubes per year. (Tr. 508-09). Moreover, in late 1990 or early 1991, Elkay acquired another plant capable of producing water coolers and could have produced at least 400,000 water coolers annually. (Tr. 509-10).

Elkay's damages expert, Michael Tate ("Tate"), a principal in the economics consulting group at A.T. Kearney, opined that Elkay had the capacity to manufacture 403,000 bottled water coolers annually. (Tr. 699). Tate also concluded that Elkay had the capacity to produce its actual units sold and any additional water coolers and/or no-spill adapters sold by Ebco. (Tr. 699-700). Thus, we find as a matter of fact that Elkay demonstrated the capacity sufficient to produce the additional no-spill units and water coolers sold by Ebco.

d. Amount of Profits Elkay Would Have Made Absent Infringement

At trial, Elkay presented two schemas for calculating lost profits. Under Scenario I, Elkay would be awarded lost profits on water cooler sales lost as a result of Ebco's infringing sales. The lost profits are calculated based on the annual market share for cooler sales achieved by Elkay in 1991, prior to Ebco's entry into the market with its WaterGuard adapters. It is assumed that Elkay would have maintained this market share

throughout the period of infringement had it not lost the competitive advantage of being the only bottled water cooler supplier offering a no-spill adapter. The lost market share is measured by the difference between Elkay's actual achieved annual market share (PDX 383) and Elkay's 1991 market share. (PDX 423C). The number of units lost each year is then multiplied by the profit per unit. (PDX 423A).

Elkay also proposed and presented evidence to support a second lost profits calculation. Under Scenario II, Elkay would receive lost profits on all water coolers sold by Ebco with a WaterGuard adapter installed prior to shipment and on all water coolers shipped with a WaterGuard adapter during the damages period. For the following reasons, we reject Scenario II as speculative and adopt Scenario I.

As a matter of fact, we find that Elkay has established that the patented device drives bottled water cooler sales to some extent. Elkay introduced the Water Safe adapter primarily to enhance the sales of its bottled water coolers. (Tr. 102-03; PTX 108). After Elkay introduced the Water Safe in 1991, it achieved a 27.3% market share for bottled water coolers, a 40% increase over Elkay's 1990 market share. We agree with Katz that the increase was attributable to the introduction of the Water Safe technology. (Tr. 108-09). In 1991, the Water Safe system was the only no-spill adapter offering its features. Subsequent to the introduction of the no-spill adapters, Elkay and Ebco have both enjoyed increased sales of water coolers sold with the Water Safe or WaterGuard adapters. (PDX 408).

Moreover, Ebco and Elkay both promote the use of their no-spill adapters for use in conjunction with bottled water coolers. (Tr. 567; *e.g.* PDX 322-324, 333). Furthermore, Sands testified that the ultimate consumers want the cooler in combination with the adapter and, therefore, distributors are likely to buy the adapter and water cooler from one source based on economic and inventory considerations. (Tr. 219-20). Significantly, Burrows testified that Ebco would lose some market share of cooler sales if it could not offer the no-spill adapter. (Tr. 1060).

Based on the foregoing evidence and testimony, we find that Elkay has established its underlying premise that no-spill adapters drive cooler sales to some extent. Nevertheless, the evidence also demonstrated that, in addition to adapters, water cooler sales are driven by many other factors such as service, product quality, price, customer relationships, design, competition, and product features. (*E.g.* Tr. 171, 916, 2556-57, 2560-64, 2573, 2653-59, 2675, 2693-94, 2727-32). Thus, we will not award Elkay lost profits on all water coolers sold by Ebco with a WaterGuard adapter installed prior to shipment and on all water coolers shipped with a WaterGuard adapter. (Scenario II).

e. Lost Profit Award

Because we find that Elkay established with a reasonable probability that adapters drive cooler sales to some extent, we award Elkay lost profits based on the its 1991 market share of water cooler sales (Scenario I), the first year the Water Safe no-spill adapter was available. Under this Scenario, it is assumed that absent Ebco's infringement, Elkay would have been able to maintain the market share gained by its exclusive sale of the no-spill technology throughout the damages period. (Tr. 3659). Elkay has established the background for Scenario I with the requisite specificity. Moreover, "[a]ny doubts regarding the calculatory precision of the damage amount must be resolved against the infringer." Kaufman Co., Inc., 926 F.2d at 1142.

In 1991, Elkay's market share measured by water cooler sales jumped to 27.3% with the introduction of the Water Safe system. When Ebco introduced its WaterGuard adapters in 1992, a no-spill device with the patented features had never before been available. Indeed, the market for no-spill products has grown every

year since 1991. (PDX 408). As the sole source for the claimed invention, Elkay's market share presumably would have continued to grow absent Ebco's infringing sales. Elkay's market share, however, began to decrease following the introduction of Ebco's infringing products. (Tr. 691-692; PDX 383). Moreover, Ebco offered its Water Guard device at a highly discounted price which prevented Elkay from further increasing its market share. (Tr. 564; PDX 403).

We find that Tate's expert report (PTX 34, 35, 35A) is credible, well supported, and equitable. Tate offered extensive support for the calculations of lost profits. (PTX 35A, *see also* PDX 400, 423, 423A-E). In addition, he based his calculations on the best available data and calculated his figures conservatively. (Tr. 695, 3692). Based on the trial testimony, we find that Tate's testimony was more credible than the testimony of Kinrich, Ebco's damages expert. Thus, we adopt Tate's calculations, methodology, and justification for the award under Scenario I. (Tr. 675-830, 3658-3696; PDX 423, 423A-E).

Accordingly, Ebco must pay \$5,612,837 for lost profits as calculated below.

Elkay's Lost Bottled Water Cooler Sales
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	1993	1994	1995	1996	1997	Total
Elkay's 1991 market share	27.3%	27.3%	27.3%	27.3%	27.3%	
Elkay's actual achieved water cooler market share	16.6%	16.7%	14.0%	20.4%	20.4%	
Lost market share	10.7%	10.6%	13.3%	6.9%	6.9%	
Adjustment *	1.3%	1.3%	1.3%	1.3%	1.3%	
Adjusted lost market share	9.4%	9.3%	12.0%	5.6%	5.6%	
Industry sales	556,497	669,449	657,649	730,504	365,252	
Elkay's lost sales from 8/20/93 to 6/30/97	19,061	62,259	78,918	40,908	20,454	221,600

FN* In 1992, Elkay's market share fell from 27.3% to 22.7%. Tate testified that 1.3% of this 4.6% decrease was attributable to Ebco's sale of 21,596 high capacity water coolers to Perrier in 1992. (Tr. 3662-65). The remaining market share drop is attributable to Elkay's differentiated product advantage being taken away by Ebco's infringing sales. (Tr. 2665). Accordingly, the lost market share figure is reduced by 1.3% to reflect the Ebco-Perrier transaction.

Elkay's Lost Profits

	1993	1994	1995	1996	1997	Total
Price per unit of bottled water coolers sold with Water Safe adapter	\$169.00	\$169.00	\$170.00	\$161.00	\$158.00	
Elkay's cost per water cooler unit	145.49	138.68	157.49	139.54	148.50	
Adjustment *	2.09	4.33	6.43	% B5 6.51	6.57	
Profit per unit	\$25.60	\$34.65	\$18.94	\$27.97	\$16.07	
Lost bottled water cooler units (see above)	19,061	62,259	78,918	40,908	20,454	221,600
Lost Profits	\$487,962	\$2,157,275	\$1,494,707	\$1,	\$328,696	\$5,612,837

FN* The adjustment takes into account the price that Elkay charged for the Water Safe unit before Ebco entered the market less the price Elkay actually charged. (Tr. 695).

3. Damages Award

For all the foregoing reasons, we find that Elkay is entitled to the profits lost on 221,600 bottled water coolers, sales that Elkay would have made but for Ebco's infringement, and a reasonable royalty of \$1.50 for each of the 1,136,165 WaterGuard adapters sold by Ebco through June 30, 1997. (PDX 423, 423B, 423C). Elkay is awarded \$1,704,249 for reasonable royalties and \$5,612,837 for lost profits. In addition, Elkay is entitled to a reasonable royalty of \$1.50 for each WaterGuard adapter sold and its lost profits as calculated above for the period from July 1, 1997 to the date of the judgment order. Elkay is also entitled to prejudgment interest for the period from August 20, 1993 until the date of the judgment order. The prejudgment interest is calculated with the 90-day United States Treasury Bill rate. For the period of August 20, 1993 to June 30, 1997, the prejudgment interest is \$776,899. (Tr. 707; PTX 34, 35, 35A, PDX 423). Accordingly, Elkay is awarded \$8,093,985 for the period from August 23, 1993 to June 30, 1997.

IV. INJUNCTION

Pursuant to 35 U.S.C. s. 283, Elkay also seeks a permanent injunction against Ebco's further manufacture, use, offer for sale, and sale of the infringing WaterGuard I, II, and III adapters. The district court has the discretion to grant an injunction to prevent the violation of any right secured by a patent. *Black & Decker (U.S.), Inc. v. Home Prod. Mktg.*, 929 F.Supp. 1114, 1121 (N.D.Ill.1996) (citing *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1281 (Fed.Cir.1988) and 35 U.S.C. s. 283. Because we have found that Ebco's adapters infringe the asserted patents and that Ebco has not presented a specific reason to deny the injunction, we will issue the requested injunction. *See Id.* In order to accommodate Ebco's customers and any orders already in progress, the injunction will become effective at 12:01 am on August 1, 1998.

V. CONCLUSION

For all the foregoing reasons, we find that Elkay has established by a preponderance of the evidence that Ebco infringed the asserted claims of the '531 and '855 patents. In addition, we find that Ebco failed to prove by clear and convincing evidence that the asserted patents are invalid and unenforceable. Accordingly, Ebco is ordered to pay the reasonable royalties, lost profits, and prejudgment interest as described in this Memorandum Order and Opinion. For the period from August 20, 1993 to June 30, 1997 Elkay is awarded:

Reasonable royalties	\$1,704,249
Lost Profits	\$5,612,837
Prejudgment interest	\$ 776,899
TOTAL	\$8,093,985

Ebco Manufacturing Company and Ebtech Corporation are also hereby permanently enjoined from manufacturing, using, selling, and offering for sale its accused WaterGuard I, II, and III no-spill adapters. In order to accommodate Ebco's customers and any orders already in progress, this injunction becomes effective at 12:01 am on August 1, 1998.

Elkay must file a petition for the reasonable royalties, lost profits, and prejudgment interest accrued from July 1, 1997 to the date of the judgment order by August 14, 1998.

It is so ordered.

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