

United States District Court,
D. Massachusetts.

**UNITED STATES FILTER CORPORATION, U.S. Filter/Ionpure, Inc., IP Holding Company,
Millipore Corporation, and Millipore Investment Holdings Limited,**
Plaintiffs.

v.

IONICS, INCORPORATED,
Defendant.

No. CIV. A. 98-10541-REK

Oct. 8, 1999.

Owner of reissue patent for electrodeionization apparatus sued for infringement. On defendant's motion for summary judgment on issue of invalidity, the District Court, Keeton, J., held that: (1) patent was not invalid as anticipated; (2) patent was not invalid under recapture rule; and (3) inadvertent misidentification of assignee assenting to reissue of original patent was not inequitable conduct warranting invalidation of reissue patent.

Motion denied.

35,741. Construed.

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Opinion

KEETON, District Judge.

I. Pending Matters

Pending for decision, after a three-day evidentiary hearing on September 14, 15, and 16, 1999, are the following motions:

(1) Defendant's Motion for Summary Judgment of Invalidity of the Patent In Suit (Docket No. 92, filed December 21, 1998) with supporting memoranda (Docket Nos. 93, 121, 129, 146, 153, 180, 211). Plaintiffs have filed numerous oppositions and replies (Docket Nos. 100, 110, 111, 125, 150, 201).

(2) At the beginning and at the end of a three-day evidentiary hearing on September 14, 15, and 16, 1999, plaintiffs moved for Partial Summary Adjudication with regard to all three of defendant's claims of patent invalidity: anticipation, impermissible recapture of surrendered subject matter, and an erroneously-designated assent of assignee of a patent for which a reissue application was pending. *See* Hearing Transcript, Volume I, at 18-19 (Docket No. 224) and Hearing Transcript, Volume III, at 40 (Docket No. 226). The substance of and the written support for plaintiffs' cross-motion for summary adjudication on these claims of defendant appear in their oppositions to Defendant's Motion for Summary Judgment. *See* Docket Nos. 110, 111, 125, 150, 201.

II. Procedural Background

This case involves plaintiffs' alleged cause of action against defendant for patent infringement. In response to plaintiffs' claims, defendant argues that plaintiffs' patent, U.S. Patent Reissue No. 35,741 (" '741 Reissue Patent"), is invalid for three reasons: (1) lack of novelty (*i.e.*, anticipation), (2) unlawful recapture of surrendered subject matter in a reissued patent, and (3) procedural errors in the filing of the reissue application, namely misidentifying the assignee of U.S. Patent 5,154,809 (" '809 Patent") from which the '741 Reissue patent reissued. As noted above, the court held an evidentiary hearing over the period of three days, September 14-16, 1999. One purpose of the hearing was to determine whether triable jury issues exist with regard to the invalidity of the '741 Reissue patent.

At the close of the three-day hearing, defendant renewed its motion for summary judgment as to the invalidity of the '741 Reissue patent. Also, plaintiffs cross-moved for partial summary adjudication that as a matter of law no genuine dispute of material fact exists as to any of the defendant's three defenses.

"So at the end of the day, your Honor, [plaintiffs] would suggest that the facts are undisputed as to the third motion, and the appropriate action we would request would be to have the court enter a partial summary adjudication that the assent of assignee filed with a technically incorrect identification of one of the assignees has no effect on the validity of the patent.

We also think at the end, your Honor, the facts will support a determination by the Court that, as a matter of law, the original application had this 'bond' language and therefore there has been no recapturing.

And as to the prior art, there are, for sure, disputed issues of fact, but on the record and Ionics' [defendant's] contention, we would suggest the Court enter partial summary adjudication that none of the references Ionics relies upon anticipates and renders on their own invalid any of the claims."

Hearing Transcript, Vol. I at 18-19.

III. Factual Background

This case arises from plaintiffs' development of an electrodeionization apparatus ("EDI") that became the subject matter of the '741 Reissue Patent. The '741 Reissue Patent, which issued on March 10, 1998, is a reissue of the '809 Patent, which issued on October 13, 1992.

Generally, the '741 Reissue Patent teaches a liquid purification process that depends on electrical forces to remove impurities, such as ionic salts, from a liquid such as water. In the EDI apparatus that is disclosed in the '741 Reissue Patent, a liquid to be purified flows through ion depleting compartments out of which ions are drawn through a permeable membrane into ion concentrating compartments by virtue of a polar electrical field. The ion depletion compartments contain mixed cation (negatively charged) and anion (positively charged) exchange resin beads in order to facilitate the migration of impurities such as ionic salts from the ion depletion compartments to the ion concentrating compartments; the ion concentrating compartments may contain ion exchange resin beads, if desired, depending upon the mode of electrodeionization.

The '741 Reissue Patent teaches an EDI apparatus in which the depletion compartments are made of a series of subcompartments formed by (1) an anion permeable membrane and a cation permeable membrane that extend along the length of the depletion compartments and (2) a pair of "ribs" that extends across the width of the depletion compartments. The '741 Reissue Patent specification describes these subcompartments as enabling an "efficient mixing of the liquid and the beads therein" by constraining the movement of solid ion exchange material and thereby effecting a more thorough and cost effective purification process. *See* '741 Reissue Patent, col. 5, lines 1-4, 44-50 (Pl.'s Ex. 4; Def.'s Ex. 501). The specification further explains that by controlling the dimensions of the subcompartments in the way that the '741 Reissue Patent describes in detail, *see id.* at col. 4, lines 50-67, the desired liquid purity can be attained with relatively less energy requirements, even over long time periods. *See id.* at col. 5, lines 50-55.

In the EDI apparatus taught by the '741 Reissue Patent, the ion exchange resin beads that are used in the ion depletion compartments and sometimes in the ion concentrating compartments are described, throughout the text of the patent, as being of "substantially uniform size." *See, e.g.,* '741 Reissue Patent at p. 116,296 ("Abstract"); col. 1, line 30 and col. 2, line 27 ("Background of the Invention"); col. 2, lines 57-63 ("Summary of the Invention"); col. 4, lines 22-23, 30, col. 7, lines 46-47, col. 9, line 52 ("Description of Specific Embodiments"); col. 12, line 43 (Claim 1, and thus also Claims 2-8 that are dependent on Claim 1); col. 14, line 37 (Claim 11, and thus also Claims 12-18 that are dependent on Claim 11); col. 15, line 26 (Claim 19, and thus also Claim 20 that is dependent on Claim 19); col. 15, line 46 (Claim 21, and thus also Claims 22-30 that are dependent on Claim 21).

The '741 Reissue Patent's specification explains "substantially uniform size" as "mean[ing] that 90% of the beads are within (plus-or-minus sign) 10% of the mean bead size and that the relative average size of one ionic form of resin beads to a second ionic form of resin beads in a mixture of resin beads is at least 0.8." *See* '741 Reissue Patent, col. 2, lines 57-63. This feature of the '741 Reissue Patent-ion exchange resin beads of substantially uniform size-is at the core of defendant's contention that claims 1-8 and 11-30 of the '741 Reissue Patent are invalid as anticipated by prior art that allegedly discloses ion exchange resin beads of substantially uniform size in EDI apparatuses.

IV. Standard of Review

A. At Summary Judgment

Summary judgment should be granted only if the court, viewing the evidence in the light most favorable to the non-moving party, determines that no genuine dispute of material fact exists. *See* Fed.R.Civ.P. 56. The movant has the "initial responsibility of informing the district court of the basis for its motion, and identifying those portions" of the record showing the absence of a genuine dispute of material fact. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986). A factual question is material if a reasonable jury could return a verdict for the non-moving party based at least in part on its determination of the factual question. *See* *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986). In a patent validity action such as this one, the burden on the party moving for judgment as a matter of law as to patent invalidity is even heavier than in other contexts generally because the patent is presumed valid. *See* 35 U.S.C. s. 282 (1994).

B. Regarding A District Court's Review of the Patent and Trademark Office's Finding of Validity

[1] [2] One who challenges a patent's validity must prove invalidity by clear and convincing evidence. *See* *Finnigan Corp. v. International Trade Com'n*, 180 F.3d 1354, 1365 (Fed.Cir.1999). Thus, in order to satisfy its burden at summary judgment, the defendant-movant must show that no genuine dispute of material fact exists that would enable a reasonable jury to find by clear and convincing evidence that the patent is valid. *See* *Anderson*, 477 U.S. at 255, 106 S.Ct. 2505; *Oney v. Ratliff*, 182 F.3d 893, 895 (Fed.Cir.1999); *Rockwell Int'l Corp. v. U.S. et al*, 147 F.3d 1358, 1361 (Fed.Cir.1998).

Defendant argues that the Supreme Court's decision in *Dickinson v. Zurko*, 527 U.S. 150, 119 S.Ct. 1816, 144 L.Ed.2d 143 (1999), requires that this court, the United States District Court for the District of Massachusetts, review the Patent and Trademark Office's (PTO's) findings of validity under the standard of review enunciated by section 706 of the Administrative Procedure Act, 5 U.S.C. s. 706. If defendants were correct in their interpretation of *Zurko*, this court would be permitted to set aside the PTO's findings if they were unsupported by "substantial evidence." *See* 5 U.S.C. s. 706(2)(E).

But the discussion in *Zurko* does not focus upon the standard of review applicable to the procedural posture of the present case, which is the review by a United States District Court of the PTO's findings under 35 U.S.C. s. 145. The procedural posture of the present case follows a path that Justice Breyer, in the majority opinion in *Zurko*, says "might well lead to Federal Circuit court/court review" on appeal. *See* *Zurko*, 527 U.S. 150, 119 S.Ct. at 1824. Instead, *Zurko* focused upon the standard of review for the Federal Circuit when it hears an appeal from the PTO under 35 U.S.C. s. 141, a path that Justice Breyer distinguishes as leading to a review by the Federal Circuit of the PTO's findings under a "court/agency" standard. *See* *Zurko*, 527 U.S. 150, 119 S.Ct. at 1817, 1824 (comparing appellate court review of findings of fact made by a district court judge under the stricter "clearly erroneous" standard with appellate court review of findings of fact made by the PTO under the less strict "substantial evidence" standard).

I do not accept defendant's argument that *Zurko* has changed the standard of review that this court must apply in reviewing the PTO's finding of a valid patent. The law is clear, and *Zurko* has not changed it, that when considering evidence that was before the patent officer or that was presumed to be before the patent officer during the prosecution of the '741 Reissue patent, I owe deference to the finding made by the patent officer with regard to that patent's validity. *See* *American Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, 1359-60 (1984), *cert. denied*, 469 U.S. 821, 105 S.Ct. 95, 83 L.Ed.2d 41 (1984). In contrast, "[w]hen new evidence touching validity of the patent not considered by the PTO is relied on, the tribunal considering it is not faced with having to disagree with the PTO or with deferring to its judgment or with taking its expertise into account." *Id.* at 1360.

Regardless of the deference owed to the patent officer, however, I must consider all admissible evidence in light of the clear and convincing standard by which patents must be proved invalid. *See id.* The point that *Zurko* clarifies, but that does not affect the standard under which this court reviews the evidence, is the point that this court's "nonexpert judicial factfinding" will be reviewed on appeal by the Federal Circuit for "clear error"-that is, under the stricter court/court standard rather than the more deferential court/agency "substantial evidence" standard-ensuring that the new evidence submitted in this patent proceeding that was not considered by the PTO will be closely scrutinized by an expert body. *See Zurko*, 527 U.S. at ----, 119 S.Ct. at 1824.

Therefore, I conclude that I must review the admissible evidence proffered to this court during the three-day hearing on September 14-16, 1999, giving deference only to those findings made by the patent examiner with regard to the evidence before him or presumed to be before him, and, when applying all the admissible evidence to defendant's three legal theories for patent invalidation-(1) anticipation, (2) impermissible recapture, and (2) the effect of procedural defects-I must determine whether sufficient admissible evidence is before me to support a jury finding that by clear and convincing evidence the '741 Reissue patent is invalid. *See id.* (outlining precisely this procedure).

V. Invalidity Analysis

A. Anticipation

In defendant's papers and during the three-day evidentiary hearing, defendant challenged the validity of the '741 Reissue Patent on the basis that it was anticipated by prior art. The instances of prior art defendant points to are as follows: (1) a 1964 article by Gerald J. Gittens and Ronald E. Watts entitled "Some Experimental Studies of Electrodeionisation Through Resin Packed Beds" ("Gittens and Watts article"); (2) a 1971 paper by V.D. Grebenyuk, T.Z. Sotskova, and N.P. Gnusin entitled "Effect of Electric Current on Electrodialyser Compartments Filled With a Mixed Bed of Variable-Composition Ion-Exchange Resins" ("Grebenyuk article"); and (3) four brochures printed by Dow Chemical Company entitled "Dowex Monosphere Resins," "Unprecedented Bead Size Uniformity Provides Near-Perfect Separation In Condensate Polishers," "The New Dowex Monosphere TG," and "With High-Performance Dowex Monosphere Resins" (collectively "Dow publications").

The parties do not dispute that the Gittens and Watts article and the Dow publications were before the patent officer during the prosecution of the '741 Reissue Patent. These references are listed on the face of the '741 Reissue Patent under "Other Publications." *See* '741 Reissue Patent at pp. 116,298-299. Also, the parties do not dispute that a 1973 article by T.Z. Sotskova *et al.* entitled "The Mechanism of the Conduction of Electric Current Through a Mixed Resin Bed" (the "Sotkova article") was before the patent officer during the prosecution of the '741 Reissue Patent. It, too, is listed on the face of the '741 Reissue Patent under "Other Publications." *See id.* at 116,299. The parties do dispute the factual issue as to whether the Sotkova article discloses the EDI apparatus in the Grebenyuk article that allegedly anticipates the patent-in-suit. Such disclosure, as matter of law, would render the Grebenyuk article less pertinent or merely cumulative with the Sotkova article that was before the patent officer during prosecution. *See Engel Indus., Inc. v. Lockformer Co.*, 946 F.2d 1528, 1533 (Fed.Cir.1991); *see also* discussion *infra*, at Part V.A. 3, "The Person of Ordinary Skill in the Art," and Part V. 4. A. 4(d) "The Grebenyuk Article and the Sotkova Article." The Grebenyuk article was not listed under "Other References" that were considered by the patent officer during the prosecution of the '741 Reissue Patent.

1. Applicable Law

A determination of anticipation involves two steps: "first is construing the claim, a question of law for the court, followed by [...] a comparison of the construed claim to the prior art." *Key Pharmaceuticals v. Hercon Laboratories Corp.*, 161 F.3d 709, 714 (Fed.Cir.1998). "The comparison process involves fact-finding, and is for the fact-finder in the first instance." *Id.* On a motion for summary judgment, however, as on a motion for judgment as a matter of law during a jury trial, it is for the court to decide whether a genuine dispute of material fact exists as to the comparison process.

[3] Invalidity by anticipation requires that the party arguing for invalidity prove by clear and convincing evidence "that each and every limitation of the claimed invention be disclosed in a single prior art reference." *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed.Cir.1994) (citations omitted). This means that if a prior art reference lacks any claimed element, then as a matter of law a decisionmaker (whether in the patent office or in a court) cannot find anticipation. *See Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1571 (Fed.Cir.1986), *cert. denied*, 479 U.S. 1034, 107 S.Ct. 882, 93 L.Ed.2d 836 (1987). "In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention." *In re Paulsen*, 30 F.3d at 1478-79.

Defendant asks this court, when considering whether the '741 Reissue Patent is invalid because it is anticipated by prior art, to look solely to the PTO's "Reasons for Allowance" (*see* Def.'s Ex. 505 at p. 117,118) to explain how (and if) the '741 Reissue Patent differs from the prior art. In the "Reasons for Allowance" statement, the patent examiner wrote:

The claims are allowable because none of the prior art of record fairly discloses or renders obvious the claimed electrodeionization method and apparatus, the ion depleting compartment comprising a mixture of anion and cation exchange resin beads having a substantially uniform size positioned between an anion exchange membrane and a cation exchange membrane.

Id.

In asking the court to look solely to the PTO's "Reasons for Allowance," defendant commits three errors. First, the defendant interprets the patent examiner's statement to mean that the only reason the '741 Reissue Patent issued was because it contains "substantially uniformed size" ion exchange resin beads. The plain meaning of this document, were I to consider only this document for purposes of determining whether or not the prior art anticipates the present patent-in-suit, is not what defendants want it to be. The patent examiner, in his statement, does not highlight the disputed "substantially uniform size" phrase alone, as do defendants. Instead, the patent examiner states that it is the "*claimed electrodeionization method and apparatus, [which includes] the ion depleting compartment ...*" (*id.*) (emphasis added) that distinguishes the invention from prior art. The patent examiner's statement contains no indication that it is the "substantially uniform size" feature, and that feature alone, that makes the invention patentable.

Defendant's second error is related to the first. By asking this court to consider the "substantially uniform size" feature, and only that feature for the purposes of the anticipation analysis, defendants implicitly invite this court to assume that each and every limitation of the '741 Reissue Patent (except for the disputed "substantially uniformed size" ion exchange resin beads feature) is disclosed in each prior art reference. Thus defendant does not offer its suggested claim construction for the terms it asks the court to assume are disclosed by the prior art. Defendant does not even offer a construction of the terms plaintiffs contend are

novel to the '741 Reissue Patent, *e.g.*, "substantially uniform size," "subcompartment," "spacer," "ribs." If this court were to accept defendant's invitation, it would be abdicating its role (assigned to it by the Supreme Court and the United States Court of Appeals for the Federal Circuit in patent infringement cases and patent invalidity determinations) of construing claims and applying that construction to each prior art reference, element by element, claim by claim. *See, e.g.*, *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed.Cir.1991) (stating (1) that "[i]nvalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference;" and (2) that it is required that no difference exist "between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention") (citations omitted). The defendant suggests a short cut, but in so doing, defendant asks the court to commit legal error.

Lastly, should the defendant be asking the court to compare the '741 Reissue Patent with the prior art only in terms of whether each prior art discloses the use of "substantially uniform size" ion exchange resin beads in an EDI apparatus, defendant effectively would be asking this court to assume that each prior art reference is not significantly different from the other for the purposes of an anticipation analysis. This not only runs counter to common sense but also is contrary to law. I therefore reject defendant's suggestions and continue with the anticipation analyses as prescribed by the United States Court of Appeals for the Federal Circuit. *See Key Pharmaceuticals*, 161 F.3d at 714.

2. Claim Construction

(a) The Prescribed Approach

In *Markman*, the Supreme Court established that the determination of the scope of a patent is "exclusively within the province of the court." *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

[4] [5] In discharging this responsibility, a court looks first to the words of the claim itself. *See Vitronics Corp. v. Conceptor, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996). Generally, the words of the claim are given their ordinary and accustomed meaning. *See Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed.Cir.1998). If some assertion is made that the words have a meaning other than their plain meaning, the court may look to the patent specification or prosecution history to see whether the patentee has in one of those places stated a clear definition. *See id.* Thus, "a technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning." *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578 (Fed.Cir.1996).

[6] Although a court may look to the specifications to resolve an ambiguous term or to find that the patentee has defined some term in a manner other than the ordinary meaning, *see Vitronics*, 90 F.3d at 1582, it is not appropriate to give effect to a patentee's attempt to impose upon the claim, through the specification, some limit that is not included in the claim itself. *See Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed.Cir.1994)("claims are not to be interpreted by adding limitations appearing only in the specification"); *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed.Cir.1993)("limitations are not to be read into the claims from the specification").

[7] Finally, when construing claims, a court may look only to extrinsic evidence, *i.e.*, "all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned

treaties [, ...] in order to aid the court in coming to a correct conclusion as to the true meaning of the language employed in the patent." *Markman*, 52 F.3d at 980 (citations and quotations omitted). Significantly, "[e]xtrinsic evidence is to be used for the court's understanding of the patent, not for the purpose of varying or contradicting the terms of the claims." *Id.* at 981. The United States Court of Appeals for the Federal Circuit has consistently cautioned United States district courts against improper use of extrinsic evidence.

The claims, specification, and file history, rather than extrinsic evidence, constitute the public record of the patentee's claim, a record on which the public is entitled to rely. In other words, competitors are entitled to review the public record, apply the established rules of the claim construction, ascertain the scope of the patentee's claimed invention and, thus, design around the claimed invention. Allowing the public record to be altered or changed by extrinsic evidence introduced at trial, such as expert testimony, would make this right meaningless.

Vitronics, 90 F.3d at 1583 (citations omitted). This rule of the proper use of extrinsic evidence during claim construction applies both to infringement analyses and invalidity determinations. *See In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed.Cir.1991); *Finnigan Corp.*, 180 F.3d at 1365.

(b) The Independent Claims

Claim 1 is one of the four independent claims in the '741 Reissue Patent. Claims 2-4 expressly incorporate claim 1 with the language "The process of claim 1 wherein...." ('741 Reissue Patent, col. 12, line 62; col. 13, lines 1, 16). Claims 5-8 expressly incorporate claim 4, which expressly incorporates claim 1, with the language "The process of claim 4 wherein...." *See id.* at col. 12, lines 49, 51, 53, 59. Claim 15 expressly incorporates claim 1 with the language "The process of any one of claims 1,2,3,4,5,6 or 8" *Id.* at col. 15, line 7.

Claims 11, 19 and 21 are also independent claims. Claims 12-14 and 16 expressly incorporate claim 11, and claim 18 expressly incorporates claim 14, which incorporates claim 11. *See id.* at col. 14, lines 61, 63, 66 and col. 15, lines 10, 16. Claim 20 expressly incorporates claim 19. *See id.* at col. 15, line 29. Claims 22-24 expressly incorporate claim 21. *See id.* at col. 16, lines 7, 10, 13. And claims 25-30 expressly incorporate claim 24, which expressly incorporates claim 21. *See id.* at col. 16, lines 24, 26, 28, 33, 36, 46.

All four independent claims contain the disputed phrase "substantially uniform size" to describe the ion exchange resin beads (both cation and anion) that are housed by the ion depleting compartments and sometimes by the ion concentrating compartments.

The independent claims, as they appear in the '741 Reissue Patent, are as follows:

We claim:

1. A process for removing organic and ionic species from a liquid which comprises the steps of:

a) providing an electrodeionization apparatus which comprises:

i) a cathode compartment at a first end of the apparatus

ii) an anode compartment at a second end of the apparatus opposite the first end

iii) at least one ion concentrating compartment positioned adjacent to at least one ion depleting compartment, the ion depleting compartment comprising a mixture of anion exchange resin beads having a substantially uniform size and cation exchange resin beads having a substantially uniform size positioned between an anion exchange membrane and a cation exchange membrane, the ion depleting and ion concentrating compartments being positioned between the cathode compartment and the anode compartment, wherein the ion concentrating compartments are free of ion exchange resin,

b) passing a first liquid through the ion depleting compartments,

c) simultaneously passing a second liquid for accepting ions from the first liquid through the concentration compartments.

d) applying an electrical voltage between an anode in the anode compartment and a cathode in the cathode compartment, and

e) recovering the first liquid from the depleting compartment....

11. A dual compartment construction adapted to remove ions from a liquid which comprises:

an ion depletion compartment and an ion concentration compartment and an odd number of at least three ion permeable membranes.

the ion permeable membranes comprising anion permeable membranes alternately positioned with respect to cation permeable membranes.

each of the ion depletion compartments and each of the ion concentration compartments comprising a spacer and a plurality of ion depletion subcompartments and ion concentration subcompartments.

the subcompartments being formed by a plurality of ribs extending along the length of each of the ion depletion compartments and the ion concentration compartments.

each of the ion depletion subcompartments and the ion concentration subcompartments containing a mixture of anion exchange resin beads having a substantially uniform size and cation exchange resin beads of substantially uniform size.

each of the ion depletion subcompartments and the ion concentration subcompartments formed by a plurality of ribs extending along the length of each of the ion depletion compartments, each of the subcompartments have a width defined by the distance between the ribs of between about 0.3 and 4 inches and a thickness between about 0.05 and 0.25 inches wherein the thickness of the subcompartments is defined by the distance between the anion permeable membrane and the cation permeable membrane

each of the ion permeable membranes being secured to a spacer and the ribs within the spacer such that the anion permeable membrane and the cation permeable membrane are positioned alternatively along the length of the dual compartment

a port for passing a first liquid to be purified through each ion depletion compartment.

and a port for passing a second liquid for accepting ions from the first liquid through each ion concentration compartment....

19. An electrodeionization apparatus comprising at least one ion concentrating compartment positioned adjacent to at least one ion depleting compartment, the ion depleting compartment comprising an ion exchange resin positioned, between an anion exchange membrane and a cation exchange membrane, wherein the ion exchange resin comprises a mixture of anion exchange resin beads having a substantially uniform size and cation exchange resin beads having a substantially uniform size, and the ion concentrating compartment being free of ion exchange resin....

21. A process for removing organic and ionic species from a liquid which comprises the steps of:

a) providing an electrodeionization apparatus which comprises:

i) a cathode compartment at a first end of the apparatus,

ii) an anode compartment at a second end of the apparatus opposite the first end,

iii) at least one ion concentrating compartment positioned adjacent to at least one ion depleting compartment, the ion concentrating compartment and the ion depleting compartment comprising a mixture of anion exchange resin beads having a substantially uniform size and cation exchange resin beads having a substantially uniform size positioned between an anion exchange membrane and a cation exchange membrane, the ion depleting and ion concentrating compartments being positioned between the cathode compartment and the anode compartment,

b) passing a first liquid through the ion depleting compartments,

c) simultaneously passing a second liquid for accepting ions from the first liquid through the concentration compartments,

d) applying an electrical voltage between an anode in the anode compartment and a cathode in the cathode compartment, and

e) recovering the first liquid from the depleting compartment.

'741 Reissue Patent (bracketed portions indicating omitted words from the '809 Patent and italicized portions indicating changed words in the '741 Reissue Patent omitted).

(c) "Substantially Uniform Size"

(i) The Parties' Positions

In the parties' papers and during the evidentiary hearing, the primary dispute with regard to defendant's anticipation argument concerned whether the prior art discloses the use of "substantially uniform size" ion exchange resin beads in an ion depleting compartment of an EDI apparatus. Defendant chose to focus on this feature of the patent to the exclusion of all others, and, as I have said *supra* at Part V.A. 1., commits

legal error in doing so. In fact, defendant has yet to argue that all of the other elements of the twenty-eight claims are anticipated by the prior art, an argument on which, as a matter of law, it would have to prevail in order to show that the prior art anticipates the patent-in-suit.

In contrast, to defend against an allegation of anticipation, the plaintiffs need only show that not every element of every allegedly anticipated claim is disclosed by the prior art. *See Kloster*, 793 F.2d at 1571. They could do so by choosing one element of the patent that exists in every allegedly anticipated claim and show how none of the prior art anticipates that element. *See id.* To defeat defendant's motion for summary judgment, plaintiffs would only have to show a genuine dispute of material fact as to whether that one claim element "reads-on" the prior art. But if plaintiffs were to show that no genuine dispute of material fact exists as to the possibility that by clear and convincing evidence the prior art anticipates one claim element common to all the allegedly anticipated claims, then, as a matter of law, plaintiffs would have shown that this issue is one for court determination as matters of law are decided and is not for determination as a genuine dispute of material fact. Furthermore, they would have shown that it is decided as a matter of law in their favor.

Plaintiffs made just such an argument at the evidentiary hearing, stating that the court should decide as a matter of law that the patent-in-suit is not invalid for reasons of anticipation. They made the argument that no jury could reasonably find by clear and convincing evidence that the prior art discloses ion exchange resin beads of "substantially uniform size" in an EDI apparatus, an element which is common to all of the claims in the '741 Reissue Patent. Thus, plaintiff argues, as a matter of law, the prior art does not anticipate the '741 Reissue Patent. (Plaintiffs also went beyond this argument to show how the prior art does not disclose many other claim elements of the patent-in-suit in an EDI apparatus (for example, "subcompartments," "spacers," and "ribs"), but, as those elements are not common to all of the allegedly anticipated claims, it is not necessary to focus on them now if a determination of the term "substantially uniform size" will be dispositive.)

(ii) Meaning of "Substantially Uniform Size"

The '741 Reissue Patent specification explicitly defines "substantially uniform size" in column 2, line 57. It reads:

By the phrase "substantially uniform size" as applied to the anion resin beads or the cation resin beads as used herein means that 90% of the beads are within (plus-or-minus sign)10% of the mean bead size and that the relative average size of one ionic form of resin beads to a second ionic form of resin beads in a mixture of resin beads is at least 0.8.

'741 Reissue Patent, col. 2, line 57-64. Here, "[t]he specification acts as a dictionary when it expressly defines terms used in the claims ..." *Vitronics*, 90 F.3d at 1582 *citing Markman*, 52 F.3d at 979.

The specification further clarifies the term "substantially uniform size" by suggesting "suitable ionic resin beads for use in the present invention," *i.e.*, ion exchange resin beads that would be of "substantially uniform size." The specification suggests the Dowex Monosphere resin beads 550A and 650C for this purpose, stating that these commercially manufactured beads fit within the size parameters previously defined.

The [Dowex Monosphere resin beads] 550A beads and 650C beads have 90% of the beads within (plus-or-

minus sign) 10% of the mean bead size. The mean bead size of the 550A anionic resin beads is 550 micrometers while the 650C cationic resin beads has a mean bead size of 650 micrometers. The relative average size of the cationic resin beads to the anionic resin beads or vice [sic] versa should be at least about 80 percent of the other resin beads, preferably of substantially equal average size.

'741 Reissue Patent, col. 3 lines 43-50. This suggestion by the patent specification to use Dowex Monosphere 550A and 650C resin beads that perfectly fit within the numerical parameters set earlier supports those parameters as definitive of the phrase "substantially uniform size."

Neither defendant nor plaintiffs dispute this numerical definition of "substantially uniform size." At the hearing and in their papers, both accept that the specification speaks for itself and acts as a dictionary definition that provides no wiggle-room for going outside the numerical parameters.

[8] I do not base my decision on an agreement between the parties, however. The reason is that the construction of the claim element is a matter of law for this court. Exercising this authority and responsibility for deciding this matter of law, I conclude that the specification is plain on its face and that no reason exists to depart from the definition that the patent provides. Thus, I conclude that "substantially uniform size" means that 90% (not substantially more and not substantially less) of the beads are within (plus-or-minus sign) 10% (not substantially more and not substantially less) of the mean bead size and that the relative average size of one ionic form of resin beads to a second ionic form of resin beads in a mixture of resin beads is at least (and not less than) 0.8.

The dispute regarding the phrase "substantially uniform size," however, does not center on precise numerical dimensions of bead size. Instead it concerns substantial *uniformity* of dimension. It concerns whether the substantial uniformity of the numerical parameters can be met by hydraulically separating ion resin beads or by sieving ion resin beads through various meshes.

Defendant argues and presented evidence purporting to show that sieving through appropriate meshes produces "substantially uniform size" ion exchange resin beads and thus the EDI apparatus disclosed in prior art that uses beads that were sieved through the appropriate mesh discloses the use of "substantially uniform size" ion exchange resin beads.

Plaintiffs argue and presented evidence that defendant's position is insupportable as a matter of law, and in the alternative that a genuine dispute of material fact exists as to whether sieving or hydraulic separation produces "substantially uniform size" ion exchange resin beads.

In evaluating this contrasting evidence, a court is not deciding an issue of claim construction. This decision is instead one to be made in the next step in the anticipation analysis—the comparison of the claim as construed by the court to the pertinent elements of the prior art from the perspective of a person of ordinary skill in the art—an analysis that requires consideration of evidence received by the court during the three-day hearing.

3. The Person of Ordinary Skill in the Art

I accept as binding guidance for my adjudication a Federal Circuit ruling stating the legal test a court is to apply in determining characteristics of the person of ordinary skill in the art.

The person of ordinary skill is a hypothetical person who is presumed to be aware of all the pertinent prior art. The actual inventor's skill is not determinative. Factors that may be considered in determining level of skill include: type of problems encountered in art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.

Custom Accessories, Inc. v. Jeffrey-Allan Industries, Inc., 807 F.2d 955, 962 (Fed.Cir.1986)(footnotes omitted). Applications of this legal test have confirmed that the test is a standard that envisions a person of relative sophistication within the field of the invention. *See In re Paulsen*, 30 F.3d 1475, 1481 (person of ordinary skill in computer industry capable of "providing the circuitry necessary to make the device operable for use as a computer"); *Biogen, Inc. v. Amgen, Inc.*, 973 F.Supp. 39, 43 (D.Mass.1997)(laboratory technician not person of ordinary skill in field of inducing nonhuman cells to produce human proteins because technicians not familiar with literature).

Defendant never presented to the court any evidence regarding the experience or level of education of persons in the field. Plaintiffs suggest in their papers that "[a]t the time the invention claimed in the '741 [Reissue] Patent was made, a person of ordinary skill in the art of the '741 [Reissue] Patent would have a B.S. or M.S. degree in a field providing a basis for understanding electrodeionization, such as physical chemistry or chemical engineering, and several years of experience in designing and working with water purification systems." Plaintiff's Proposed Additional or Substitute Findings and Conclusions, Docket No. 179 at 53. Considering the factors established in *Custom Accessories*, I conclude that plaintiffs' suggestion is apt in part. The factors listed in *Custom Accessories* that plaintiffs do not suggest, but which I conclude are necessary in order to determine what one of ordinary skill in the art would understand from the prior art at issue, are that a person of ordinary skill in the art "is presumed to be aware of all the pertinent prior art ... [and] the type of problems encountered in [the] art ... [as well as] prior art solutions to those problems." *Custom Accessories*, 807 F.2d at 962. These factors are important for the current invention because, by all parties' accounts, the state of the art, in particular the commercialization of EDI systems, had changed in important ways since publication of the Gittens and Watts article, the Grebenyuk article and the Sotskova article. *See Goldstien Declaration*, Docket No. 194 at para. 10; *Ganzi Declaration*, Docket No. 192 at para. 6. Because of this, a person of ordinary skill in the art would have to be able to assess on a reasoned basis the difference between the prior art from decades past (such as the Gittens and Watts article) and the more recent prior art (such as the Dow publications) in light of the disputed novelty (*e.g.*, the contribution of "substantially uniform size" ion exchange resin beads) of the '741 Reissue Patent.

4. Comparing the Claim as Construed to the Prior Art

(a) Preliminary Matters

(i) Deference Owed The Patent Examiner Regarding Prior Art Considered During Patent Prosecution

As a preliminary matter, I reiterate that deference is owed the patent examiner's finding of validity (*i.e.*, that the prior art did not anticipate the patent in suit). The patent examiner had the Gittens and Watts article, the Dow publications and the Sotskova article before him during the prosecution of the '741 Reissue Patent (as is indicated by his initials next to the prior art citation, *see* Def.'s Ex. 505 at 117,050, Pl.'s Exs. 10, 11 ("Sotskova article"), Pl.'s Ex. 13 ("Gittens and Watts article") and the list under "Other References" on the '741 Reissue Patent, *see* Def.'s Ex. 501 at 1-2.) Also, under applicable precedent, he is presumed to have considered the prior art as is required of an examiner in order to do the examiner's job properly. *See Molins*

PLC v. Textron, Inc., 48 F.3d 1172, 1186 (Fed.Cir.1995) ("The examiner initialed each reference, indicating his consideration of the same, and stated that he had considered all the prior art. Absent proof to the contrary, we assume that the examiner did consider the references."). *See also Markman*, 52 F.3d at 986 (stating that "patent examiners[] [are] quasi-judicial officials trained in the law and presumed to have some expertise in interpreting the [prior art] references and to be familiar from their work with the level of skill in the art")(bracketed phrase "[prior art]" in original) (citations and quotations omitted). Furthermore, "[w]here the patent in suit has been reissued under the provisions of 35 U.S.C. s.s. 251 and 252, after consideration by the PTO of art not considered during the original prosecution [as is the case here with the '741 Reissue Patent, *see* '741 Reissue Patent at 1], the presumption of validity remains intact, and the challenger's burden of proof imposed by that presumption, as an evidentiary matter, is usually more difficult to sustain." *Kaufman Co., Inc. v. Lantech, Inc.*, 807 F.2d 970 (Fed.Cir.1986).

(ii) Relevancy Objections

During the three-day hearing, defendant offered the testimony of Dr. Gerald J. Gittens, co-author of the Gittens and Watts article, for the purpose of "simply confirm[ing] for the court those portions of that publication which teach the use in an EDI apparatus of beads of substantially uniform size." Hearing Transcript, Vol. I at 20. Defendant also offered the testimony of Dr. Robert Kunin as "a pioneer researcher in [the EDI field] ... [who] has served with the manufacturers of the very beads we're talking about ... [who can] confirm again for the court just what the Gittens and Watts patent discloses." *Id.*

Plaintiffs objected to Dr. Gitten's written and oral testimony (*see* Gittens Declaration, Docket No. 196) on relevance grounds. They also objected to paragraphs 15-46 of Dr. Kunin's written testimony (Kunin Declaration, Docket No. 195) and to his oral testimony in its entirety on relevance grounds. As with all evidentiary objections and motions during the three-day hearing, I took them under advisement with the case. I determine now, based on Dr. Kunin's professional accomplishments and experiences and his continuous research on ion exchange technology, ion exchange resin beads, water treatment and chemical processing, that Dr. Kunin's oral testimony and written declaration is relevant to what one of ordinary skill in the art would consider the prior art at issue to disclose. For the same reasons of professional accomplishments and experiences and continuous research on ion exchange technology, Dr. Thomas A. Davis's testimony (Davis Declaration, Docket No. 191) and Gary C. Ganzi (Ganzi Declaration, Docket No. 192) are also relevant to what one of ordinary skill in the art would consider the prior art at issue to disclose. I therefore overrule defendant's objection to the admissibility of the testimony of Dr. Kunin, Dr. Davis and Mr. Ganzi and consider all of them for the above stated purpose.

Whether Dr. Gittens' testimony is relevant, however, is less clear. In 1964, when Dr. Gittens co-authored the Gittens and Watts article, he was intimately involved with electrodeionization apparatuses. *See* Hearing Transcript, Vol. I at 122. He admitted, however, to leaving that particular field soon thereafter and moving to ceramics. *See id.* Twenty-five years passed before the application was filed for the '809 Patent, the patent from which the '741 Patent reissued. And thirty-one years passed before the application for the '741 Reissue Patent was filed that included the Gittens and Watts article as a prior art reference. By this time, nearly three decades later, Dr. Gittens was no longer working with EDI. *See id.* Dr. Gitten's testimony, which is uncontroverted, makes clear that in 1989 and again in 1996, he would not have been aware of the prior art references in the '809 Patent (*e.g.*, the Dowex Monosphere Resin Brochures, Mar. 1988) and he would not have been aware of the prior art references in the '741 Reissue Patent that were published after 1964 (*e.g.*, the Grebenyuk article and the Dow publications). *See id.* at 133. At one time Dr. Gittens may have been one who could qualify to give testimony about characteristics of one of ordinary skill in the art of

electrodeionization apparatuses. But in 1989 he no longer qualifies. Thus, although he is the co-author of the Gittens and Watts article, and his testimony is relevant as to whether his article discloses an EDI apparatus using "substantially uniform size" beads to a person of ordinary skill in the art in 1964, his testimony is not relevant as to whether a person of ordinary skill in the art in 1989 would understand his article to disclose the use of "substantially uniform size" beads in an EDI apparatus. In the analysis that follows, comparing the prior art to the '741 Reissue Patent, I consider Dr. Gittens' testimony for the purpose of illuminating his article, as its author, not as speaking directly to what a person of ordinary skill in the art in 1989 would consider it to disclose with regard to the patent-in-suit.

In addition to allowing Dr. Gittens' testimony in for that purpose, however, and because I recognize that a higher court might take a different position with regard to the relevance of his testimony, I have considered what decision I would make if I received his testimony into evidence without limitations, on the one hand, and with the above-stated limited purpose, on the other hand, and I have concluded that I would reach the same determination as to the validity of the '741 Reissue Patent under either of these different ways of proceeding.

Plaintiffs made other relevancy objections with regard to Defendant's Exhibits Nos. 519 ("Gittens and Watts article"), 520 ("Grebenyuk article"), 521-24 (the Dow publications), 525 (Dr. Kunin's Book "Ion Exchange Resins") and 526 ("Millipore Idea Disclosure") that were offered by defendant for the purpose of showing that the prior art anticipates the '741 Reissue Patent. I now determine that Defendant's Ex. Nos. 519-525 are relevant for this purpose, *i.e.*, that they have sufficient probative weight for this permissible purpose, and that their relevance is not outweighed by other factors to be considered by this court under Federal Rule of Evidence 403. In particular, although Dr. Kunin's book does not speak to the issue of anticipation before this court, it does provide background relied upon by Dr. Kunin in his assessment of what is disclosed by the prior art in relation to the patent-in-suit. As to Defendant's Exhibit No. 526, "Millipore Idea Disclosure," I do not consider it to be relevant to the issue of anticipation before me and therefore sustain plaintiffs' objection as to that exhibit. The use of that exhibit was to show that plaintiffs experimented with the Dowex Monosphere Resin beads in their development of electrodeionization apparatuses. That fact is not in serious dispute; plaintiffs disclose that fact to the world on the face of their patent, and to this court in particular in their papers and in their testimony. Furthermore, experimentation with commercially available products does not, by itself, support a determination of anticipation as defendant contends. *See* my discussion of the Dow publications below at Part V.A. 4(c).

Defendant made relevancy objections as to Plaintiffs' Exhibits Nos. 18, (Ionics Interoffice Memo), 19 (British Patent 1,050,960), 20 (Gittens and Glueckauf article "The Application of Electrodialysis to Demineralisation" (1965)), 21 (Perry Chemical Engineers' Handbook at 8-8 (6th Ed.1984)), 22 (Leschonski article "Sieve Analysis, the Cinderella of Particle Size Analysis Methods?" (1979)), 23 ("British Standard Specification for Test Sieves"), 24 (Otten and Fischer article, "Optical Size vs. Hand Screening" (1990)) and 25 ("Sotskova article") that were offered by plaintiffs for the purpose of showing that the prior art does not anticipate the '741 Reissue Patent. I now determine that Plaintiffs' Exhibit Nos. 18-20 are not relevant for this purpose and therefore they are not admitted or considered by me in my determinations that follow. Furthermore, I determine that Plaintiffs' Exhibits Nos. 21-24 are only relevant in so far as they provide context to Dr. Kunin's opinion to which he testified that scientists will differ as to the accuracy of sieve analysis when controlling for particle size. *See, e.g.*, Hearing Transcript, Vol. II at 93. I do not admit them for the truth of the analyses they contain but only for the background they provide for Dr. Kunin's testimony when he says that he does not agree with scientists who declare, for example, that: "Finally, sieves are completely useless to measure particle size distribution of the so-called 'uniform particle size' resins..." (*see*

Pl.'s 24 at 338). I do consider Plaintiffs' Exhibit No. 25, the Sostkova article, to be relevant for the purpose of determining whether or not the prior art anticipates the '741 Reissue Patent. I therefore admit it over defendant's objections and consider it for that purpose in the analysis that follows.

(b) The Gittens and Watts Article

Much of plaintiffs' cross-examination of Dr. Gittens and Dr. Kunin focused on the accuracy of hydraulic separation and sieving for the purpose of separating ion exchange resin beads into groups of "substantially uniform size." The Gittens and Watts article reports experiments that controlled for bead size by using these two separation techniques. *See* Gittens and Watts article, Def.'s Ex. 519 at pp. 4-5. (The Grebenyuk article (*see* Def.'s Ex. 520 at p. 987) also reports the use of sieving to control for bead size in EDI apparatuses.) One issue raised by the present motion is whether these techniques disclose the use of "substantially uniform size" beads as I have construed that term in the '741 Reissue Patent.

Under cross-examination, Dr. Gittens conceded that sieving in order to produce substantially uniform size ion exchange resin beads is a less than perfect process. *See* Hearing Transcript, Vol. I at 133, 145. He also explained that the experiments described in the Gittens and Watts article used sieving to control for the size of the ion exchange resin beads, but that he did not measure the beads as they were separated by the sieves; instead, he used a British Standard Specification for Test Sieves that recorded data on mesh sizes and indicated in percentage terms what the maximum variation in particle size could be after sieving through specified meshes. *See* Hearing Transcript, Vol. I. at 140-143.

In the experiments reported in the Gittens and Watts article that used hydraulic separation to control for resin bead size, Dr. Gittens explained that he did make microscopic measurements to determine the success of the hydraulic separation (and the article confirms this, *see* Def.'s Ex. 519 at p. 5). Dr. Gittens then conceded that his article does not indicate the size of the sample measured, and he conceded that knowing the sample size would help to determine the accuracy of the measurements. *See* Hearing Transcript, Vol. II. at 27-28.

In addition to the admissions and testimony cited above, I note several passages in the Gittens and Watts article itself that compel me to conclude that no reasonable jury could find by clear and convincing evidence that to a person of ordinary skill in the art the Gittens and Watts article discloses the use of "substantially uniform size" ion exchange resin beads in an EDI apparatus such as the one taught by the '741 Reissue Patent.

First, on page 22, the Gittens and Watts article explicitly states that "[t]he parameters of importance in any discussion of electrodeionisation are the current density, solution concentration, flow rates, bead size and crosslinking The present report is *not designed to deal fully with the bead size problem* and not at all with the resistance of beds; these problems are at present under a more thorough investigation." Def.'s Ex. 519 at 22 (emphasis added). To a person of ordinary skill in the art as I have defined that person, this caveat in the discussion of the article that reports the experiments' results suggests that the procedures used did not adequately control for the size of ion exchange resin beads in order to make a determination of whether or not (or how) bead size has effects on the electrodeionization process.

Second, Figures 14 and 15 of the Gittens and Watts article, which are graphs that describe the "Dependence of [Current Efficiency] on Screening Range of Particle" and "Dependence of [Current Efficiency] on Particle Radius (r)", demonstrate that, according to the authors, the uniformity of size of ion exchange resins (as

controlled by mesh ratios (Fig.14) and by estimated particle size range (Fig.15)) had no effect on the efficiency with which the EDI apparatus purified the water. *See id.* at 2 (defining "current efficiency" as "percentage of total current that is carried by the [sodium] ions"). *See also* Hearing Transcript, Vol. I at 135 (defining "current efficiency" as "the electric current that's making the ions move out of the depleting compartment.") Dr. Gittens admitted as much under cross-examination. *See id.* at 137-38 (admitting that "the one experiment [reported] that deals with particle size efficiency concludes that it has no effect [on current efficiency]"). *See also* Def. Ex. 519, "Gittens and Watts article" at p. 25 (stating that the authors' initial "hypothesis that particle size range has an effect on current efficiency is fallacious"). These figures and accompanying explanations demonstrate to a person of ordinary skill in the art that to the extent many sizes of ion exchange resin beads were used in the experiments and were accounted for, the experiments revealed no correlation between uniformity of bead size and the current efficiency of the EDI apparatus.

[9] On the record and evidence before me, I conclude that no reasonable jury could find by clear and convincing evidence that a person of ordinary skill in the art would understand the Gittens and Watts article to show or imply the use of "substantially uniform size" ion exchange resin beads in an EDI apparatus such as the one disclosed by the '741 Reissue Patent. A person of ordinary skill in the art would not be able to determine, by reading the Gittens and Watts article, whether the ion exchange beads were accurately separated by size within the range permitted by the patent or whether such a separation mattered at all for the results of the purification process. Furthermore, such a person would read that article and understand it to suggest that particle size was not a variable closely considered by the authors.

For all of these reasons, I uphold the patent officer's findings of no anticipation by the Gittens and Watts article. This finding does not consider all the other elements of claims 1-8 and 11-30 that may or may not be anticipated by the Gittens and Watts article. But because "substantially uniform size" ion exchange resin beads is an element in every allegedly anticipated claim, and because I have determined that that element is not anticipated by the Gittens and Watts article, I conclude as a matter of law that the Gittens and Watts article cannot be found to anticipate the '741 Reissue Patent. *See, e.g.,* Kloster Speedsteel AB, 793 F.2d at 1571 ("the absence from the reference of any claimed element negates anticipation").

Finally, it is worth noting at this time, that no where in defendant's papers and never during the hearing did defendant attempt to compare all the other elements of the claims of the '741 Reissue Patent to the Gittens and Watts article as would be required for a finding of anticipation as matter of law. Thus, even if a higher court were to disagree with my determination today that no reasonable jury could find by clear and convincing evidence that "substantially uniform size" ion exchange resin beads as I have construed them are disclosed by the Gittens and Watts article, defendant has still not met its burden at summary judgment to prove that no genuine dispute of material fact exists as to the anticipation of all the other elements of all the twenty-eight disputed claims of the '741 Reissue Patent.

Furthermore, defendant has not made any argument or proffered any evidence that would allow me to find as a matter of law that the Gittens and Watts article is enabling as precedent requires. *See In re Paulsen*, 30 F.3d at 1479. An enabling disclosure is not "tossing out the mere germ of an idea" but the provision of "reasonable detail ... in order to enable members of the public to understand and carry out the invention." *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed.Cir.) *cert. denied*, 522 U.S. 963, 118 S.Ct. 397, 139 L.Ed.2d 310 (1997). Based on the record before me, I cannot find as a matter of law that the patent officer made a mistake when it implicitly found (by issuing the '741 Patent over the prior art) that the Gittens and Watts article does not sufficiently describe the invention claimed in the '741 Reissue Patent, in particular its use of "substantially uniform size" ion exchange resin beads in ion-depleting compartments

and sometimes in ion-concentrating compartments, "to have placed it in possession of a person of ordinary skill in the field of the invention." In re Paulsen, 30 F.3d at 1479.

(c) The Dow Publications

No dispute exists between the parties on the point that the Dow publications that defendant contends anticipate the '741 Reissue Patent were all before the patent examiner during the prosecution of the patent-in-suit. I therefore give the proper deference to the patent officer's finding of no anticipation with regard to these prior art references. *See* Molins PLC, 48 F.3d at 1186; Kaufman, 807 F.2d at 974.

The Dow publications advertise the use of DOWEX MONOSPHERE resins for water treatment. (Capital letters appear in original publications and indicate commercial product.) Dow states in its brochures that one selling point of this product is that these DOWEX MONOSPHERE resins do not vary significantly in size. "With DOWEX MONOSPHERE resins, you get 90% of the beads within (plus-or-minus sign)10% of the mean bead size. And with size control so precise, we measure DOWEX MONOSPHERE resins in microns rather than mesh sizes." Def.'s Ex. 521 at 3. *See also* Def.'s Ex. 522 entitled "Unprecedented Bead Size Uniformity Provides Near-Perfect Separation in Condensate Polishers"; Def.'s Ex. 524 at 5 "New Monosphere Tough Gel TG" (stating that "outstanding bead size uniformity" is a feature that "translates into an array of added performance improvements"); Def.'s Ex. 523 at 3 "With DOWEX MONOSPHERE Resins" (stating that "since DOWEX MONOSPHERE resins have better size uniformity, less eluent is required").

No dispute exists between the parties that these DOWEX MONOSPHERE resins are precisely the ion exchange resin beads that the '741 Reissue Patent suggests as "suitable ... for use in the present invention." *See* '741 Reissue Patent, col. 3, line 40. All parties agree, and I so conclude, that the Dow publications disclose "substantially uniform size" ion exchangeresin beads exactly as I have construed them.

[10] The parties do dispute, however, whether the Dow publications disclose "substantially uniform size" ion exchange resin beads in an EDI apparatus as described by the '741 Reissue Patent. For the reasons that follow, I conclude that no reasonable jury could find by clear and convincing evidence that the Dow publications disclose "substantially uniform size" ion exchange resin beads in an EDI apparatus as described by the '741 Reissue Patent.

The Dow publications do not describe any particular invention with specificity. On the contrary, the Dow publications are advertisements the goal of which is to convince others that the Dow products will improve certain processes for purifying liquid. One of these processes is chemically regenerated ion exchange, a process that uses chemicals, not electricity, to regenerate the ion resins that are used to deionize the liquid in the purifying machine. Another one of these processes may be electrodeionization, as is described by the '741 Reissue Patent. The Dow publications do not specify which process will be improved by their product, although credible and uncontroverted testimony of defendant's witness Dr. Kunin showed that the Dow publications relate to chemical regenerated ion exchange and not to electrodeionization. *See* Hearing Transcript, Vol. II at pp. 65-70.

The Dow publications focus, in general, on convincing the audience that the DOWEX MONOSPHERE resins would greatly enhance the capabilities and efficiency of water purifying processes. Plaintiffs admit to purchasing DOWEX MONOSPHERE resins and experimenting with them in their development of EDI apparatuses. And, under cross-examination, so do defendants. *See* Hearing Transcript, Vol. I at 44. When

asked "isn't it true that [defendant] Ionics worked with both Dowex Monosphere Resins and other Dow resins during this later 1980 period when your research [on EDI] began to accelerate," defendant-witness Dr. Goldstein (CEO of Ionics) admitted that he "would suspect that's correct." *Id.*

What both sides demonstrated during the three-day evidentiary hearing with regard to the Dow publications, then, was that the Dow publications were successful at convincing their audience of the value of Dow's products. What was also demonstrated, and was never in dispute, was that the DOWEX MONOSPHERE resins were the ion exchange resin beads used as a model of "substantially uniform size" in the EDI apparatus claimed by the '741 Reissue Patent. The mere experimentation and/or presence of these ion exchange resin beads in an EDI apparatus does not make the '741 Reissue Patent invalid, however. The prior art must disclose element for element, claim by claim, the invention at issue. *See In re Paulsen*, 30 F.3d at 1479. And, then, the prior art must also be enabling. *Id.* Defendant failed to meet its burden on all of these accounts: no testimony or other admissible evidence was proffered that would allow a reasonable jury to find by clear and convincing evidence that the Dow publications anticipate and enable the claimed EDI invention as disclosed in the '741 Reissue Patent. One fact that the evidence proved to be beyond genuine dispute was the fact that the Dow publications advertise the sale of ion exchange resin beads of "substantially uniform size" for use by companies like defendant Ionics and plaintiff U.S. Filter in the development of their liquid purification processes, among other applications. This showing cannot be a showing of enablement, however, as I agree with the PTO that no EDI apparatus was described at all in the prior art at issue. *See Genentech*, 108 F.3d at 1366 (stating that "[t]ossing out the mere germ of an idea does not constitute enabling disclosure").

(d) The Grebenyuk Article and The Sotskova Article

No evidence before me shows that the patent examiner had the Grebenyuk article before him during the prosecution of the '741 Reissue Patent. The record shows that the patent examiner did have the Sotskova article before him, however, an article which is explicitly a continued analysis of the results and functioning of the apparatus described by the Grebenyuk article. *See Sotskova* article, Pl.'s Ex. 25 at 1597 (stating that "the apparatus [to be compared with the present one] has already been described in detail" and then citing to the Grebenyuk article in footnote 8).

The Sotskova article describes itself as a comparison of the results from the EDI apparatus described in the Grebenyuk article with an EDI apparatus experimented upon by Sotskova and others that differs from the EDI apparatus in the Grebenyuk article "by the fact that there are contacts between ion exchangers of different kinds, *i.e.* there are dipolar boundaries." *Id.* at 1597. Thus, as the Grebenyuk article and the EDI apparatus described therein are embodied in the Sotskova prior art reference, *i.e.*, the Grebenyuk article "is cumulative to other prior art that was before the patent examiner," *Engel Indus., Inc. v. Lockformer Co.* 946 F.2d 1528, 1533 (Fed.Cir.1991), I conclude that the deference owed to the patent examiner with regard to his finding that the Sotskova article does not anticipate the claimed EDI apparatus taught by '741 Reissue Patent is properly extended to the Grebenyuk article. *Id.* (stating that cumulative or less pertinent prior art references are not material to a finding of inequitable conduct when the more pertinent prior art has been cited to the patent examiner). Furthermore, as I must look to the Grebenyuk article in order to properly compare the EDI apparatuses as described by the Sotskova article to the claimed EDI apparatus as taught by the '741 Reissue Patent in order to make a determination as to anticipation, I infer that the patent examiner had to act similarly in order to do his job properly.

No evidence was proffered by the defendant that the Grebenyuk article or the Sotskova article discloses

element for element and claim by claim the EDI apparatus taught by the '741 Reissue Patent. The only evidence proffered by defendant regarding the Grebenyuk article was for the purpose of proving that the Grebenyuk article discloses an EDI apparatus that uses "substantially similar size" ion exchange resin beads.

A careful reading of the Sotskova article reveals references to a mixture of KU-2 and AV-17 ion exchange resins in an EDI apparatus (*see* Sotskova article at 1597) as well as "macroporous KU-2P-6, KU-2P-10, and KU-2P-16 cation-exchange resins ... mixed with AV-17P macroporous anion-exchange resins." *See id.* at 1598. The article indicates the size of the resin beads only as to the latter mixture. It reads "[t]o ensure an identical sorption surface in all the mixtures, resin fractions with 0.8-1 mm grain diameters were selected." *Id.* The article does not indicate how that size was attained, whether resin beads were sieved, hydraulically separated or purchased as ostensibly all of substantially the same size. Neither defendant nor plaintiffs proffered any evidence to the court that would illuminate these references in the Sotskova article.

Much of the presentations by the parties during the hearing concerned the size of the ion exchange resins disclosed in the experiment described in the Grebenyuk article to which the Sotskova article refers. Like the Sotskova article, the Grebenyuk article also refers to a mixture of KU-2 and AV-17 resins. *See* Grebenyuk article at 987. But unlike the Sotskova article, the Grebenyuk article states that "[b]y screening through a sieve, a grain fraction with a 0.49-0.51 mm diameter was selected. To separate spherical grains from fragments and irregular granules, the chosen resin fraction was poured on to an inclined plane while the fragments remained." *Id.*

The oral testimony and written declarations in evidence regarding the accuracy and reliability of sieving as a process to control for bead size is as applicable to the comparison of the Grebenyuk article to the patent-in-suit as it was to the comparison of the Gittens and Watts article to the patent-in-suit. *See supra* Part V.A. 4(b). Defendant's witnesses concede that sieving is an imperfect process, made more imperfect by the lack of a record of actual measurements in the Grebenyuk article (as is the case in the Gittens and Watts article). *See* Hearing Transcript, Vol. II at 79-80. Furthermore, the uncontroverted testimony before the court was that (in order to be as accurate as possible, and how accurate is still unclear from the evidence before me) resin beads must be sieved through two meshes in order to calculate the proper range of diameters in which all the resulting resin beads should fall. *See id.* *See also* Hearing Transcript, Vol. I at 140. But as Dr. Kunin conceded on cross-examination, the Grebenyuk article used resin beads that were screened through only one sieve, not two. *See* Hearing Transcript, Vol. II at 79. *See also* Grebenyuk article at 987 ("by screening through *a* sieve...") (emphasis added). Upon realizing his mistaken assumption with regard to the Grebenyuk article, Dr. Kunin admitted as correct that "it's not possible to get a range" using a single sieve and that "the article doesn't say how many times the samples were sieved" and that "[the Grebenyuk article] gives no details on [the authors'] sieving procedure." *Id.*

Given that defendant's witness admitted that the sieving procedure used by Grebenyuk was flawed—a sieving procedure the reliability of which was already brought into doubt by the previous testimony regarding the Gittens and Watts article of defense witnesses Drs. Gittens and Kunin—little (if any) credible evidence remains before the court that could be considered as support for a determination that defendant could show that the Grebenyuk article discloses to one of ordinary skill in the art the use of "substantially uniform size" ion exchange resin beads in an EDI apparatus just like the one taught by the '741 Reissue Patent. On the contrary, the evidence is overwhelmingly in favor of the plaintiffs; even when the admissible evidence is considered in a light favorable to the defendant, I conclude that no reasonable jury could find by clear and convincing evidence that the Grebenyuk article and the Sotskova article disclose to a person of ordinary skill in the art the use of "substantially uniform size" ion exchange resin beads in the EDI apparatus as

claimed by the '741 Reissue Patent.

Finally, as noted earlier in Part V.A. 4(b) above, defendant proffered no testimony or other evidence that compared all the other elements of the allegedly anticipated claims of the '741 Reissue Patent to the apparatus described in the Grebenyuk article and the Sotskova article. In fact, Dr. Kunin admitted under cross-examination that the Grebenyuk article (and by association the Sotskova article) does not disclose (and therefore cannot enable) many of the undisputed elements of the allegedly anticipated claims of the '741 Reissue Patent. Among these are elements such as separate ion depleting and ion concentrating compartments or subcompartments made of permeable membranes and a pair of ribs. *See* Hearing Transcript, Vol. II at 75-76. Thus, even if a higher court were to disagree with my determination today that no reasonable jury could find by clear and convincing evidence that "substantially uniform size" ion exchange resin beads as I have construed them are disclosed by the Grebenyuk and Sotskova articles, defendant has still not met its burden, in relation to a motion for summary judgment, to prove that no genuine dispute of material fact exists as to the anticipation of all the elements of all the disputed claims of the '741 Reissue Patent by the prior art.

B. Recapture

Defendant's second argument for invalidating the '741 Reissue Patent is that plaintiffs impermissibly recaptured subject matter in the '741 Reissue Patent that was surrendered during the prosecution of the original patent.

1. Facts as to Recapture

The '741 Reissue Patent reissued from the '809 Patent. On the face of the '741 Reissue Patent, the PTO names "Related U.S. Patent Documents" as follows:

Reissue of:

Patent No.: 5,154,809

Issued: Oct. 13, 1992

Appl. No.: 417,950

Filed: Oct. 6, 1989

U.S. Applications:

Continuation of Ser. No. 613,075, Mar. 8, 1996, abandoned, which is a continuation of Ser. No. 332,187, Oct. 12, 1994, abandoned, which is a continuation of Ser. No. 908,913, Sep. 18, 1986, Pat. No. 4,925,541, which is a division of Ser. No. 762,804, Aug. 2, 1985, Pat. No. 4,632,745, which is a continuation of Ser. No. 628,930, Jul. 9, 1984, abandoned, said Ser. No. 417,950, Oct. 6, 1989, Pat. No. 5,154,809, is a continuation-in-part of Ser. No. 275,314, Nov. 23, 1988, Pat. No. 4,931,160, which is a continuation of Ser. No. 48,161, May 11, 1987, abandoned.

'741 Reissue Patent at 1.

The genealogy of the '809 Patent as quoted above and as stated on the first page of the '741 Reissue Patent indicates that the '809 Patent is a derivation of two lines of patent applications and patents. One line begins with abandoned application number 628,930 from which emerges the divisional application number 762,804, which issues as Patent No. 4,632,745 (" '745 Patent"). Also from the 762,804 application emerges the divisional application number 908,913 which issues as Patent No. 4,925,541 (" '541 Patent"). And then also from the 908,913 application emerges the continuation applications number 322,187 and 613,075, both of which were abandoned. The other line of patent applications and patents from which the '809 Patent emerges begins with the abandoned application number 48,161. From that application emerges the continuation application number 275,314 which issues as Patent No. 4,931,160 (" '160 Patent"). Also from the application number 275,314 emerges the '809 Patent as a continuation-in-part.

Many claim limitations of the '809 Patent were amended and became part of the '741 Reissue Patent. The only limitation defendant disputes as impermissibly recapturing limitations previously surrendered, however, is the word "secured" in the '741 Reissue Patent that replaces "bonded" in the '809 Patent. This "secured" language is in claims 4 and 11 of the '741 Reissue Patent (and thus also in claims 5-8 and 12-18 that are dependent on claims 4 and 11) and appears as follows:

"4.... [said anion permeable membrane and the said cation permeable membrane being bonded] *the anion exchange membrane and the cation exchange membrane each being secured* to a spacer to [effect sealing against water] *create a seal against liquid* leakage between [said] *the ion [depletion] depleting* compartment....

11.... each of [said] *the ion permeable membranes being [bonded] secured to* a spacer and [said] *the ribs* within [a] *the spacer* such that the anion permeable membrane and *the cation permeable membrane* are positioned alternatively along [said] *the length of the dual compartment.*"

'741 Patent, col. 13, lines 30-34, and col. 14, lines 50 (all italics and brackets in the text of the '741 Reissue Patent) (brackets indicate words in the '809 Patent that were omitted from the '741 Reissue Patent and italics indicate the words that were added to the '741 Reissue Patent).

2. Applicable Law

35 U.S.C. s. 251 (1954) is the section of the Patent Act that allows for reissuance of patents under certain circumstances. In pertinent part, the section reads as follows:

Whenever any patent is, through error without any deceptive intention, deemed wholly or partly inoperative or invalid, by reason of a defective specification or drawing, or by reason of the patent claiming more or less than he had a right to claim in the patent, the Commissioner shall, on the surrender of such patent and the payment of the fee required by law, reissue the patent for the invention disclosed in the original patent, and in accordance with a new and amended application, for the unexpired part of the term of the original patent. No new matter shall be introduced into the application for reissue....

No reissued patent shall be granted enlarging the scope of the claims of the original patent unless applied for within two years from the grant of the original patent.

Id.

The so-called "recapture rule," which flows from s. 251 of 35 U.S.C., prevents a patentee from regaining through reissue the subject matter surrendered during the prosecution of the original patent in an effort to obtain allowance of that original patent. *See Mentor Corp. v. Coloplast*, 998 F.2d 992, 995 (Fed.Cir.1993). Under this rule, claims that are "broader than the original patent claims in a manner directly pertinent to the subject matter surrendered during prosecution" are impermissible and therefore invalid. *Id.* at 996.

[11] The first step for a court in applying the recapture rule is to determine whether and in what aspect the reissue claims are broader than the patent claims. *In re Clement*, 131 F.3d 1464, 1468 (Fed.Cir.1997). Of course, a reissue claim that is narrower in scope than the original application escapes the recapture rule entirely. *See Ball Corp. v. United States*, 729 F.2d 1429, 1436 (Fed.Cir.1984).

The second step is to determine whether the broader aspects of the reissued claims relate to surrendered subject matter and, if they do, to determine whether the broader claims are an attempt to recapture, impermissibly, limitations that were surrendered in order to overcome prior art rejection. *In re Clement*, 131 F.3d at 1468. This determination requires an examination of the prosecution history of the original patent. *Id.* at 1469.

3. Parties' Positions

The first argument between the parties concerns the meaning of "original" in the reissue statute, 35 U.S.C. s. 251. Plaintiffs say that "original" means the patent to which the patent examiner looks to correct the alleged "error" that s. 251 allows. In other words, the "original" patent is the patent from which the new corrected patent reissues. In the present case, the '741 Reissue Patent is a reissuance of the '809 Patent, *i.e.*, the '741 Reissue Patent corrects errors made in the '809 Patent. Therefore, plaintiffs argue, the court must look to the prosecution history of and the application for the '809 Patent to examine whether during that prosecution any language relating to "bonded" was surrendered in order to overcome prior art rejections.

Defendant argues that "original" means all of the patents in the '809 family, that is, all of the applications (abandoned and continued) and all of the issued patents that preceded the '809 Patent and from which the application of the '809 Patent is a divisional, continuation and a continuation-in-part application. *See* '809 Patent, Def.'s Ex. 502 at 1 "Related U.S. Application Data." FN1 Under defendant's theory, a reviewing court, such as this court in this case, would have to look at all the applications related in any way to the '809 Patent—those that eventually issued as patents and those that were abandoned—and to their prosecutions to determine if a claim limitation was surrendered that relates to the present disputed claim element "secured" of the reissued patent.

FN1. The genealogy of the '809 Patent as related in the text of the '809 Patent differs from the genealogy related in the '741 Reissue Patent. The "Related U.S. Application Data" in the '809 Patent reads "Continuation-in-part of Ser. No. 908,913, Sep. 18, 1986, Pat. No. 4,925,541, which is a division of Ser. No. 762,804, Aug. 2, 1985, Pat. No. 4,632,745, which is a continuation of Ser. No. 628,930, Jul. 9, 1984, abandoned." The relevant difference between this genealogy and the one related in the '741 Reissue Patent is that in the text of the '809 Patent, the '809 Patent is a continuation-in-part of the application number 908,913 whereas in the text of the '741 Reissue Patent, the '809 Patent is a continuation of application number 908,913 not a continuation-in-part. In a continuation application, the applicant has reformulated her claims after a rejection by the PTO, whereas in a continuation-in-part application, the applicant has supplemented her original application—the specification and the claims—with new subject matter to cover improvements made since the first application was filed. The difference does not matter for the analysis and my conclusion

that follow, but I note the difference in order to remark upon the ambiguity in the genealogy of the patents, an ambiguity that makes a reasoned and thorough culling of the "family of patents and their applications" for indications as to why some applications were rejected and why others were not, a position defendant's urge upon this court, a very difficult position to sustain.

To support its argument, defendant cites to a recent case, *Elkay Manufacturing Company v. EBCO Manufacturing Company*, 192 F.3d 973 (Fed.Cir.1999) in which the opinion states that "[w]hen multiple patents derive from the same initial application, the prosecution history regarding that claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same limitation." *Id.* at 980. What defendant does not say is that *Elkay* is a case that centers around a district court's claim construction that was dispositive of the issue of patent infringement before it. *Elkay* is not a recapture case and does not purport to be referring to the "original" patent as that term is used in s. 251 of the Patent Act.

In citing *Elkay* as support for its recapture analysis, defendant confuses the court's role in construing claims for the purposes of an infringement analysis with the court's role in looking to the prosecution history of a first patent that reissues as a second patent due to some error in the first patent. In claim construction, the court must give meaning to patent claims and compare that meaning to allegedly infringing devices. The court does so, sometimes, by looking to the prosecution history if, for example, some assertion is made that the words have a meaning other than their plain and customary meaning. *See Renishaw PLC*, 158 F.3d at 1249. By contrast, in a recapture analysis, the court compares the claim limitation of a reissued patent that was changed as a result of an error in the first patent, and, based on the prosecution history of the first patent that concerns that limitation, determines whether or not the reissued claim limitation incorporates language that was purposely omitted from the first patent as a result of the PTO's prior art evaluation. Although, in both cases, the court looks to the prosecution histories of patents, the court does so for different reasons.

[12] To do as defendant asks would require scouring through multiple prior applications (some abandoned and some pursued) and prosecution histories, some that only remotely relate to the subject matter of the patent at issue and some that may more directly relate to it, looking for explanations of surrendered subject matter and determining whether those explanations should render invalid the reissued patent. This is not an exercise for the court that is likely to lead to sensible results. It is also not an exercise in which s. 251 of the Patent Act requires that a reviewing court engage. Furthermore, no good reason exists to interpret the word "original" in the s. 251 of the Patent Act to mean anything other than its common-sense meaning; the "original" patent is the patent that is corrected by the reissue patent. Defendant is misguided by defendant's misinterpretation of the language in *Elkay* and by applying that language to a recapture analysis. Therefore, I conclude that I must look only to the prosecution history of the '809 Patent, the "original" patent with regard to the '741 Reissue Patent, in order to determine whether language relating to "secured" was surrendered during prosecution of the '809 Patent to overcome some prior art rejection, which would then render the corresponding claims of the '741 Reissue Patent invalid.

Because I so conclude, the testimony and evidence relating to the patents and patent applications other than the '809 Patent and the '741 Reissue Patent that were offered for the purpose of showing impermissible recapture of subject matter are irrelevant. This includes Def.'s Exhibits Nos. 509 (Prosecution History of Patent Application No. 628,930), 510 (Prosecution History of Patent Application No. 762,804), 511 (Prosecution History of Patent Application No. 908,913), 512 (Prosecution History of Patent Application No.

48,161), 513 (Prosecution History of Patent Application No. 275,314), 514 (Prosecution History of Patent Application No. 322,187), 515 (Prosecution History of Patent Application No. 617,075), 516 (Patent No. '541), 517 (Patent No. '160), 518 (Defendant's Rendition of the "Family Tree" of '741 Reissue Patent), and the following paragraphs of Docket No. 196, Lappin Declaration: para. 4 (except for the statements regarding the application number 417,950, the '741 Reissue Patent and the '809 Patent), para. 7-26, para. 28, para. 34, para. 35, para. 42 (only the last paragraph beginning "The PTO examiner who examined..."), para. 47, para. 48. Other objections regarding paragraphs of the Lappin Declaration to which I have thus far not responded are overruled.

4. Application of Law of Recapture to Facts

(a) Is "Secured" Broader than "Bonded"

[13] The only change from the '809 Patent to the '741 Reissue patent that defendant disputes is the word "bonded" in the '809 Patent to the word "secured" in the '741 Reissue Patent. Two propositions, besides common sense and ordinary meaning, lead me to the conclusion that "secured" is a broader term than "bonded." The first proposition is that the specification of the '741 Reissue Patent itself defines the word "bonded" as a subset of the word "secured." *See* '741 Reissue Patent, col. 4, lines 54-55 ("securing, such as by bonding"). The second proposition is that in the prosecution of the reissue application 778,714 which issued as the '741 Reissue Patent, the patent applicants declared to the patent officer in the required declarations that one of the errors in the original patent was that it did not claim as much as the applicants had a right to claim, in particular, the membranes did not have to be "bonded" together but could be secured by other means. *See* Def.'s Ex. 505 at 117072-83. Based on the '741 Reissue Patent specification and the declarations of the inventors of the apparatus described by the '809 Patent, as well as on common sense and ordinary meaning, I conclude that "secured" is broader in meaning than "bonded" as those words appear in the '741 and '809 Patents respectively.

(ii) Does the term "Secured" Relate to Subject Matter Surrendered in the Prosecution of the '809 Patent?

The prosecution history of the '809 Patent demonstrates that the term "bonded" appears in the application for the '809 Patent (application number 417,950 (the " '950 application")) exactly as it appears in the issued patent. *Compare* Def.'s Ex. 504 at 117194-200 *with* Def.'s Ex. 502, col. 12, line 58; col. 12, line 42; and col. 14, line 59. This indicates that any changes made in the application to overcome prior art rejections did not have to do with the word "bonded". *See* Def.'s Ex. 504 at 117194-200. Furthermore, a thorough review of the prosecution history of the '809 Patent reveals that no substantive changes were made to the claims as written in the '950 application in order to be issued as the '809 Patent. The changes that were made were procedural, *e.g.*, filing a terminal disclaimer to overcome the PTO's rejection based on the judicially created doctrine of obviousness-type double patenting, *see id.* at 117242-45, and amending the "Reference to Related Applications" to indicate prior issued patents to which the '950 application relates. *See id.* at 117231-34. This review of the prosecution history demonstrates that nothing was surrendered during the prosecution of the '809 Patent that relates to "bonded."

Nothing having been surrendered, the change from "bonded" in the '809 Patent to "secured" in the '741 Reissue Patent cannot be an impermissible recapture. I therefore conclude that no jury could reasonably find by clear and convincing evidence that the '741 Reissue Patent is invalid for violating the recapture rule.

C. Assent of Assignee

Defendant's last argument to invalidate the '741 Reissue Patent is that plaintiffs failed to obtain the assent of the proper assignee of the '809 Patent when the reissue application was filed. This procedural flaw, defendant argues, is the basis for patent invalidity.

1. Facts as to Assent of Assignee

No dispute exists as to the facts regarding plaintiffs' failure to list the proper assignee of the '809 Patent on the reissue application. The pertinent undisputed facts are as follows:

On December 14, 1993, Millipore Corporation ("Millipore Corporation"), a Massachusetts corporation, who at the time was the sole and exclusive owner of '809 Patent, assigned its entire right, title and interest in the '809 Patent to its wholly-owned subsidiary Millipore Investment Holdings Limited ("Millipore Investment"), a Delaware corporation. *See* Def.'s Ex. 508 at 1, 5.

On October 12, 1994, the inventors named in the original '809 Patent filed an application for reissue of the patent and as part of the reissue application, filed with the PTO a document entitled "Assent of Assignee." The document identified Millipore Corporation as the "assignee of the entire right, title and interest in the '809 Patent." *See* Def.'s Ex. 504 at 11727; Pl.'s Ex. 5.

The parties do not contest the fact that the "Assent of Assignee" contained an inadvertent error. It identified Millipore Corporation instead of Millipore Investment Holdings as the assignee of the "entire right, title and interest" in the '809 Patent.

On March 10, 1998, the PTO reissued the '809 Patent as the '741 Reissue Patent apparently without notice of the error in the "Assent of Assignee" as the '741 Reissue Patent names on its face the "Assignee: Millipore Corporation, Bedford, MA." *See* Def.'s Ex. 501.

On or about March 9, 1999, Millipore Investment filed with the PTO a written Nunc Pro Tunc Assent to the reissue of the '809 Patent as the '741 Reissue Patent. The PTO accepted Millipore Investment's Nunc Pro Tunc Assent for recording. *See* Pl.'s Ex. 7.

2. Applicable Law

"Inequitable conduct resides in failure to disclose material information, or submission of false material information, with an intent to deceive, and those two elements, materiality and intent, must be proven by clear and convincing evidence." *Kingsdown Medical Consultants v. Hollister Inc.*, 863 F.2d 867, 872 (Fed.Cir.1988). More recently, the Federal Circuit has reiterated:

Technical violations of PTO procedures, absent fraud or intentional deception, are not inequitable conduct as would invalidate the patent. The courts have consistently rejected the notion of per se forfeiture [of patent rights] based on non-fraudulent failure to comply with a rule of practice before the PTO.

Seiko Epson Corp. v. Nu-Kote Int'l, 190 F.3d at 1366-67 (Fed.Cir.1999) *citing* *Hebert v. Lisle Corp.*, 99 F.3d 1109, 1116 (Fed.Cir.1996) ("A holding of unenforceability based on the filing of a false oath requires that the oath was false, and made with knowledge of the falsity.... Knowledge of falsity is predicate to intent to deceive.") and *Molins PLC v. Textron, Inc.*, 48 F.3d 1172, 1184 (Fed.Cir.1995) ("intent to deceive should be determined in light of the realities of patent practice, and not as a matter of strict liability whatever the

nature of the action before the PTO").

According to Federal Circuit precedent, proof of inequitable conduct before the PTO requires the district court to engage in a two-step analysis. First, the district court decides whether the proffer of admissible evidence before it supports a finding by clear and convincing evidence "of both materiality with regard to the omitted information, and of deceptive intent in the withholding of information." *Akron Polymer Container Corp. v. Exxel Container, Inc.*, 148 F.3d 1380, 1383 (Fed.Cir.1998) (citations omitted). Second, the court weighs at once the degrees of materiality and intent and decides, "in the sound exercise of its equitable discretion ... whether inequitable conduct has occurred." *See id.*

3. Relevance Rulings

Defendant objected to the relevance of plaintiffs' proffers of the following written declarations that were proffered for the purpose of defending against defendant's allegations of fraud on the PTO: Docket No. 184, Affidavit of Andrew T. Karnakis, employed by Millipore Corporation and Millipore Investment as Assistant General Counsel and Director of Patents and Licensing between the years 1983-1996; Docket No. 185, Affidavit of Peter C. Lando, attorney of record for the prosecution of the '741 Reissue Patent on behalf of U.S. Filter Corporation; Docket No. 186, Affidavit of Peter W. Walcott, Executive Vice President, Secretary, and a Director of Millipore Investment, and, for the past eighteen years, the Assistant General Counsel of Millipore Corporation. I now determine that the relevance of these affidavits is not outweighed by other factors to be considered by this court under Federal Rule of Evidence 403 and that these affidavits have sufficient probative weight for the purpose for which they were proffered.

4. Applying Facts to Law

[14] It is undisputed that plaintiffs failed to comply with section 1.172 of title 37 of the Code of Federal Regulations that requires that upon application of a reissue patent, a "reissue oath must be signed and sworn to by the ... inventors ... and must be accompanied by the written consent of all assignees..." 37 C.F.R. s. 1.172. It is also undisputed that plaintiffs did not intend to deceive or defraud the PTO. The core of the parties' dispute is whether the error in misnaming the assignee in the "Assent of Assignee" as Millipore Corporation instead of Millipore Investment is a material error.

Plaintiffs argue that the inadvertent mis-naming of the assignee was harmless procedural error that cannot be a basis for invalidating an otherwise valid patent. They proffer evidence, which defendant does not contest, that shows that the reissue application was filed with the knowledge, authorization and permission of Millipore Investment and on its behalf as the true assignee despite the fact that Millipore Corporation was listed as the alleged assignee. *See* Docket No. 186, Walcott Affidavit, para. 12-13. *See also* Docket No. 184, Karnakis Affidavit, para. 7. Plaintiffs also assert through various uncontested affidavits that the reissue application would have been prosecuted in an identical manner had Millipore Investment been identified as the assignee instead of Millipore Corporation. *See id.* at para. 14; Docket No. 185, Lando Affidavit, para. 17. These proffers of uncontested evidence, plaintiffs assert, together prove that no inequitable conduct occurred with regard to the prosecution of the '741 Reissue Patent. Thus, plaintiffs argue, defendant's third attack on the validity of the '741 Reissue Patent should fail as a matter of law.

Defendant argues that an error of this sort-falsely naming the assignee in a reissue patent application-is reason to invalidate the patent because the PTO's requirement of the filing of an assent of assignee with a reissue patent is a "substantive rule [][t]he purpose of [which] ... is to prevent somebody who doesn't own the patent from seeking to vary the scope of the patent rights without the permission of the owner of the

patent." Hearing Transcript, Vol. III at 21. This argument I understand to be directed toward the materiality prong of the inequitable conduct test. Without satisfying the "intent to deceive" prong, however, defendant's argument fails as a matter of law.

Thus, I now determine on the evidence before me, as a matter of law, that plaintiffs' error in naming Millipore Corporation instead of Millipore Investment as the assignee of the '809 Patent for the purposes of the reissue application cannot rise to the level of inequitable conduct that would require the '741 Reissue Patent to be held invalid.

VI. Remaining Relevancy Objections

Remaining for consideration are objections to the relevancy of other proffers of evidence identified in this paragraph. Those objections relate to Docket No. 194, Direct Testimony of Arthur L. Goldstein, para. 2-6 and 11-12, and Plaintiffs' Exhibit No. 17. I now determine these objections to be moot. The court's findings of fact and the evaluative determinations applying law to the factual circumstances of this case have been recited and explained throughout this opinion. In no instance has the court's decision depended in any degree on whether or not it should consider any of these outstanding challenged proffers of evidence. Even if the challenged evidence could be taken as satisfying the threshold of relevance, in no instance was it of sufficient probative weight to affect the court's finding of fact or evaluative determination.

ORDER

For the foregoing reasons, it is ORDERED:

(1) Defendant's Motion for Summary Judgment of Invalidity of the Patent In Suit (Docket No. 92, filed December 21, 1998) is DENIED;

(2) Plaintiffs' Motion for Partial Summary Adjudication (submitted orally at the evidentiary hearing, *see* Hearing Transcript, Vol. III at 40) with regard to defendant's claim of patent invalidity for reasons of anticipation, impermissible recapture of surrendered subject matter, and an erroneously-designated assent of assignee of a patent for which a reissue application was pending is ALLOWED. **These defense contentions of patent invalidity are rejected as a matter of law.**

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