

FRICTION DIV. PRODUCTS v. EI DU PONT De NEMOURS, 693 F. Supp. 114 (D. Del. 1988)

**U.S. District Court for the District of Delaware - 693 F. Supp. 114 (D. Del. 1988)
August 25, 1988**

693 F. Supp. 114 (1988)

**FRICTION DIVISION PRODUCTS, INC., Plaintiff,
v.
E.I. Du PONT de NEMOURS & COMPANY, INCORPORATED, Defendant.**

Civ. A. No. 84-218-JRR.

United States District Court, D. Delaware.

August 25, 1988.

***115 *116** Samuel V. Abramo of Abramo & Abramo, Wilmington, Del. (Steven Kreiss, of Wigman & Cohen, Arlington, Va., John S. Child, Jr. of Synnesvedt & Lechner, Philadelphia, Pa., and John S. Munday, Paoli, Pa., of counsel), for plaintiff.

Jack B. Blumenfeld, of Morris, Nichols, Arsht & Tunnell, Wilmington, Del. (Robert C. Kline, and Earl L. Handley, Legal Dept., E.I. Du Pont de Nemours & Company, Wilmington, Del. and Lawrence F. Scinto, and Lawrence A. Stahl, of Fitzpatrick, Cella, Harper & Scinto, New York City, of counsel), for defendant.

OPINION

ROTH, District Judge.

I. INTRODUCTION.

A. The Nature of the Suit.

This case is a patent infringement action now before the Court for the second time on defendant's motions for summary judgment. Since the filing of defendant's motions, plaintiff has also filed a cross-motion for summary judgment. Plaintiff is Friction Division Products (FDP), a manufacturer of friction products such as disc brake pads and drum brake linings. FDP is one of the larger suppliers of original equipment brakes. Defendant is E.I. DuPont de Nemours & Company (DuPont). DuPont manufactures and sells aramid fibers, under the trademark "Kevlar," in *117 various forms (*e.g.*, continuous filament, cut fiber, and pulp) for a variety of end uses, including friction products.

FDP charges DuPont with infringing and inducing others to infringe United States Letters Patent No. 4,374,211 ('211 patent). DuPont denies infringement, asserts the invalidity of the '211 patent in view of the prior art, and charges FDP with inequitable conduct in its procurement. By counterclaim, DuPont seeks a declaratory judgment that the '211 patent is invalid, not enforceable and not infringed.

The '211 patent arises from the search in the 1970's for a replacement for asbestos in the manufacture of friction products. Asbestos fiber had been widely used as an effective friction material. It added to tensile strength, was relatively inexpensive, and was easily preformed into the intermediate product used to form the shape and size of the end product. In response, however, to the awareness of the health hazards associated with asbestos, the industry began looking for a replacement material. An important goal in the search for a substitute was to find a composition which would give structural integrity or "green strength" to the preforms and thereby permit the continued use of the existing equipment and techniques which were being employed in the manufacture of asbestos-containing friction materials.

In 1972, DuPont commercialized Kevlar, a synthetic aramid. Kevlar in its fiber form was used experimentally, as early as 1976, as a replacement for asbestos. Kevlar pulp, a very short, highly fibrillated form of Kevlar fiber, was later developed and was found to eliminate the clumping problem that occurred when Kevlar fibers were mixed. On November 1, 1979, two DuPont scientists, Drs. Loken and Merriman, visited FDP and met with Philip Dougherty and John Gallagher, the named inventors of the '211 patent. At that meeting, Loken and Merriman made a presentation to FDP on Kevlar fiber and pulp and recommended their use in non-asbestos friction materials. Dr. Loken later on April 15, 1980, presented a paper, entitled "Asbestos Free Brakes and Dry Clutches Reinforced with KEVLAR Aramid Fiber" (Loken Paper), at a Society of Automotive Engineers conference.^[1] The Loken paper taught, among other things, that "Kevlar pulp can also be used to reinforce wet and dry friction mixes. The pulp knits well and effectively prevents crack propagation, increasing the toughness of the mix." *Friction Division Products, Inc. v. E.I. DuPont de Nemours & Co.*, [658 F. Supp. 998](#), 1008 (D.Del.1987) (*Friction I*). In addition, in February, 1980, DuPont had published in the *Research Disclosure Journal* an article, entitled "Manufacture and Applications of Pulp of Kevlar Aramid Fiber." This publication disclosed the uniform and easy dispersibility of Kevlar pulp. A1390.^[2]

On September 25, 1981, FDP filed its application for the '211 patent. The abstract of the '211 patent states:

The addition of aramid polymer pulp fiber to non-asbestos type friction material compositions results in a marked improvement in the flexural strength and structural integrity of preforms used in the manufacture of friction elements. The consequent handling characteristics of the preform lead to significant improvements in ease of manufacturing of the friction element.

A1274. The '211 patent contains 40 claims which are grouped into several categories:

- (1) generic claims (Nos. 1-4, 18-26, 30-34);
- (2) organic non-asbestos claims (Nos. 8-12, 28 and 36);
- (3) semi-metallic claims (Nos. 5-7, 27 and 35); and
- (4) hydrocarbon cold forming claims (Nos. 12-17, 29 and 27).

The present action was brought in April, 1984. Following the completion of discovery, ***118** DuPont filed its original motion for summary judgment of invalidity of all asserted claims of the '211 patent in April, 1986. This Court in *Friction I* granted DuPont's motion with respect to the generic and organic claims, holding that they were invalid under 35 U.S.C. § 102(b). We did not in *Friction I* fully adjudicate the motion with respect to the semi-metallic claims because FDP had amended the alleged invention date and scope of those claims during briefing.

Claims 5-7 of the '211 patent comprise the semi-metallic composition claims. These claims are dependent and are set forth below with relevant references:

1. A non-asbestos type friction material composition suitable for use as a friction element consisting essentially of a thermosetting binder, a fibrous reinforcing material, and an effective amount of an aramid polymer pulp fiber to result in good structural integrity of a preform manufactured from said friction material.

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5. The composition of claim 2, wherein: said non-asbestos type friction material is semi-metallic material.

6. The composition of claim 5, wherein: said semi-metallic material contains phenolic resin, carbonaceous particles, non-asbestos fibers, ceramic powders, and metal powder.

7. The composition of claim 6, wherein: aid semi-metallic material comprises

from 4 to 13 wt % of phenolic resin,

from 15 to 40 wt % of carbonaceous particles,

from 0 to 25 wt % of non-asbestos fibers,

from 2 to 10 wt % of ceramic powder and

from 15 to 40 wt % of metal powder

Claim 27 and 35 are the semi-metallic method claims and are set forth below with relevant references:

23. A method of making a preform of a non-asbestos type friction material, comprising: forming a mixture of a thermosetting binder, fibrous reinforcing material and an effective amount of an aramid polymer pulp fiber to result in good structural integrity of said preform and compressing said mixture to form a preform.

25. The method of claim 24, wherein: said aramid polymer pulp fiber is included in an effective amount up to 15% by wt based upon the total weight of all other ingredients.

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27. The method of claim 25, wherein: said non-asbestos type friction material is semi-metallic material.

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30. In a method of manufacturing a friction element which includes the steps of forming a mixture of a friction material composition, compressing said mixture to form a preform, curing said preform at an elevated temperature, and forming a friction element from said cured preform, wherein the improvement comprises including an effective amount of aramid polymer pulp fiber to result in good structural integrity of the preform.

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34. The method of claim 33, wherein: said aramid polymer pulp fiber is included in an amount from 0.5 to 10% by weight based upon the total weight of all other ingredients.

35. The method of claim 34, wherein: said non-asbestos type friction material is semi-metallic material.

FDP has vacillated as to the scope and invention date of the semi-metallic claims.^[3] In a supplemental response to Interrogatory No. 1, dated January 23, 1985, Dougherty, FDP's president and a named inventor of the '211 patent, had stated that the semi-metallic claims were conceived from about April 1 to 13, 1981, and were reduced to practice on or about April 14, *119 1981.^[4] A240-41. DuPont filed its first motion for summary judgment on April 14, 1986, based on the April, 1981, invention date. On April 15, 1986, the day after DuPont filed its summary judgment motion, FDP filed a new supplemental answer to Interrogatory No. 1.

A1421. In this response FDP represented that the conception date and date of reduction to practice of the semi-metallic claims took place between March to August 1980. DuPont alleged that the change in date was in response to its showing in its summary judgment motion that the work of Nuturn prior to April, 1981, anticipated the '211 patent. *Transcript*, June 20, 1986, at 12.

FDP responded that the invention date was not changed to preclude anticipation by Nuturn, but instead was revised when it was discovered that certain FDP experiments would support an earlier invention date. *Declaration of John S. Child* at A1883-84 (former FDP counsel who assisted in the preparation of the April 15, 1986, supplemental response to Interrogatory No. 1). FDP claimed that experiments by two of its employees, Vearling and Tretina, supported the 1980 invention date for the semi-metallic claims. *Vearling Declaration* at A1496. The Vearling experiment appears in his notebook with the date of June 10, 1980. The Tretina experiment is dated June 5, 1980. A1740 and 1741. Given these dates, FDP now asserts the March-August, 1980, invention period on the theory that the conception date of the semi-metallic claims could have been as early as March, 1980, when FDP was experimenting heavily with Kevlar pulp. *Transcript*, June 20, 1986 at 54-55.^[5]

Reliance on the Vearling and Tretina experiments not only changed the invention date claimed by FDP, but also changed its construction of the scope of the semi-metallic claims.^[6] The Vearling formulation had *120 only about 15 percent metallic components. As we noted in *Friction I*, DuPont had not considered such a low percentage of metallic content to be within the semi-metallic claims:

According to [earlier testimony] by Dougherty, one of the named inventors of the '211 patent, in order for a formulation to be considered "semi-metallic" there must be a "preponderance of metal" or a "great percentage" of metal in the formula.

658 F. Supp. at 1013.

Given the changing scope and invention date of the semi-metallic claims, DuPont had new arguments regarding the anticipation or obviousness of those claims. Accordingly, we permitted DuPont to resubmit its motion.

In considering this second motion, it is helpful first to review what was decided in *Friction I* where we made findings pertaining to the semi-metallic claims that are relevant to the questions before us today. We held in *Friction I* that the '211 patent does not teach novel production methods:

[T]he '211 patent discloses the same performing production methods known and used in the manufacture of friction materials in the prior art. The mixing and preforming processes are the same except for slight differences in the temperatures and times in the curing process. Moreover, these differences are irrelevant to the claimed process since they are not set forth anywhere in the patent claims, specifications or the file history.

658 F. Supp. at 1009. We spoke to the '211 production methods as a whole, including the semi-metallic composition methods of claims 27 and 35. Given that the '211 production methods were well-known in the prior art, our focus in the present motion is upon the validity of the semi-metallic composition claims 5-7.

We further found in *Friction I* that the improved structural integrity of the preform through the use of Kevlar pulp was an inherent property of the compositions taught by the Loken Paper, and, as such, was not patentable. *Id.* at 1010. We also observed that semi-metallic preforms within the '211 patent were previously made by both DuPont and Nuturn but that a question of fact existed whether these inventions were reduced to practice. *Id.* at 1012-13. Finally, we held that the semi-metallic work of DuPont, Nuturn and Griffin Wheel was not abandoned, suppressed or concealed. *Id.* at 1013-14.

Based on the expanded scope of the semi-metallic claims asserted by FDP, DuPont renews its motion for summary judgment. DuPont argues that the semi-metallic claims of the '211 patent are invalid because: (1) they are anticipated by the Loken Paper and by the prior work of Auto Friction and Griffin Wheel; (2) they are obvious; and (3) they are fatally indefinite. DuPont further argues that the '211 patent is unenforceable because of FDP's inequitable conduct before the Patent Office.

II. ANALYSIS.

Our analysis begins with the teaching of two recent Supreme Court cases that interpreted summary judgment under Federal Rule of Civil Procedure 56. *See Anderson v. Liberty Lobby, Inc.*, [477 U.S. 242](#), 106 S. Ct. 2505, 91 L. Ed. 2d 202 (1986); *Celotex Corporation v. Catrett*, [477 U.S. 317](#), 106 S. Ct. 2548, 91 L. Ed. 2d 265 (1986). In *Celotex*, the court observed that "[s]ummary judgment is properly regarded not as a disfavored procedural shortcut, but rather as an integral part of the Federal Rules as a whole, which are designed to secure the just, speedy, and inexpensive determination of every action." 477 U.S. at 327, 106 S. Ct. at 2555 (quoting Fed.R.Civ.P. 1). With this policy in mind and construing the facts in a light most favorable to the non-moving party, the Court must enter summary judgment where the record before it presents "no genuine issue of *material* fact" for trial. *Anderson*, 477 U.S. 247-48, 106 S. Ct. at 2510; *see also Townsend Engineering Co. v. Hitec Co. Ltd.*, 829 F.2d *121 1086, 1089 (Fed.Cir.1987) (citations omitted); *Goodyear Tire & Rubber Company v. Releasomers*, 824 F.2d 953, 954 (Fed.Cir. 1987) (citation omitted).^[7] Materiality is determined by the substantive law governing the case. *Anderson*, 477 U.S. at 248, 106 S. Ct. at 2510.

The party bringing the motion for summary judgment bears the initial burden of showing that no issue of material fact exists. *Celotex*, 477 U.S. at 323, 106 S. Ct. at 2553. However, when a motion for summary judgment is properly supported, "an adverse party may not rest upon the mere allegations or denials of the adverse party's pleading, but the adverse party's response, by affidavits or as otherwise provided by this rule, must set forth specific facts showing that there is a genuine issue for trial." Fed.R.Civ.P. 56(e).

Summary judgment analysis is the same for a patent case as for any other type of case. *Freeman v. Minnesota Mining and Manufacturing Co.*, [675 F. Supp. 877](#), 882 (D.Del. 1987). The Court of Appeals for the Federal Circuit has stated:

Many, if not most, suits for patent infringement give rise to numerous and complex factual issues, rendering those suits inappropriate for summary judgment disposition. Where no genuine issue of material fact is present, however, courts should not hesitate to avoid an unnecessary trial by proceeding under Fed.R.Civ.P. 56 without regard to the particular type of suit involved.

Chore-Time Equipment v. Cumberland Corp., 713 F.2d 774, 778-79 (Fed.Cir.1983); *see also Union Carbide v. American Can Co.*, 724 F.2d 1567, 1571 (Fed. Cir.1984) ("the statutory purposes of the grant of summary judgment under Fed.R.Civ.P. 56 are without question intended to be effectuated in patent litigation ..."). Because DuPont filed its summary judgment motions before FDP cross-moved, we will consider DuPont's renewed motion first.

As the '211 patent was duly issued by the United States Patent Office, we must, by statute, presume that the semi-metallic claims are valid. 35 U.S.C. § 282. Further, we must presume each claim valid "independently of the validity of the other claims." *Id.* The burden of proving invalidity rests on DuPont. Invalidity of a duly issued patent such as the '211 must be proved by clear and convincing evidence. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1375 (Fed.Cir.1986), *cert. denied*, ___ U.S. ___, 107 S. Ct. 1606, 94 L. Ed. 2d 792 (1987). A showing by DuPont of prior art which was not before the '211 patent examiner would be probative of invalidity.

A. Prior Publication: The Loken Paper.

DuPont first urges that summary judgment may be granted on the ground that the semi-metallic claims were described in a prior publication, the Loken Paper. According to the construction of the semi-metallic claims now adopted by FDP, DuPont argues, there is no patentable difference between the invalid organic claims and the semi-metallic claims. It follows then, asserts DuPont, that the semi-metallic claims are described by the Loken Paper and are, therefore, invalid under 35 U.S.C. § 102(b)^[8] as were the organic claims.

The standard to be applied in determining anticipation under § 102(b) was set out in *Friction I*.

'For a prior publication to be sufficient to defeat a patent it must exhibit a substantial representation of the invention in such full, clear and exact terms *122 that one skilled in the art may make, construct and practice the invention without having to depend on either the patent or on his own inventive skills.'

Universal Athletic Shoes Co. v. American Gym, Recreational & Athletic Equipment Corp., 546 F.2d 530, 544 (3rd Cir. 1976) *cert. denied*, 430 U.S. 984, 97 S. Ct. 1681, 52 L. Ed. 2d 378 (1977)

(quoting *Philips Elec. & Pharm. Ind. Co. v. Thermal & Elec. Ind. Inc.*, 450 F.2d 1164, 1169 (3d Cir.1971)). *Grefco, Inc. v. Kewanee Industries, Inc.*, [499 F. Supp. 844](#), 850 (D.Del.1980), [*aff'd without opinion*, 671 F.2d 495 (3d Cir.), *cert. denied*, 454 U.S. 1086, 102 S. Ct. 644, 70 L. Ed. 2d 621 (1981)].

658 F. Supp. at 1008-09.

The Loken Paper formula contains (1) phenolic resin, (2) non-asbestos fibers (wollastonite), (3) cashew friction particles (4) ceramic powder (Barium sulphate) and (5) Kevlar pulp. DuPont points out that this same formulation formed the basis for FDP to charge four different Nuturn products with infringement of the *semi-metallic claims*. As FDP adopted such a construction of the semi-metallic claims, DuPont reasons, it brought those claims within the teaching of the Loken Paper.

FDP does not respond directly to the argument that no distinction exists between the organic and semi-metallic claims; it does not explain why the Nuturn products are charged with infringing the semi-metallic claims. Instead, FDP argues that the Loken Paper does not disclose metal powder and carbonaceous particles as ingredients. Both of these ingredients are recited in claims 6 and 7. Further, FDP argues that the Loken Paper does not teach that Kevlar pulp can be used to improve structural integrity. As to the former argument, we agree. Loken does not disclose elements which are described in the '211 specification as typical of semi-metallic claims.^[9] For this reason, the Loken Paper does not "exhibit a substantial representation of the [semi-metallic] invention...." *Friction I*, 658 F. Supp. at 1008. With regard to FDP's latter contention, as we pointed out in *Friction I*, the Loken paper does speak to improved structural integrity. "*The pulp knits well* and effectively prevents crack propagation, increasing the toughness of the mix." 658 F. Supp. at 1010 (emphasis not in the Loken paper). Moreover, as we held in *Friction I*, we do not, in fact, have to resolve this issue of whether the Loken paper teaches that the addition of Kevlar pulp improves structural integrity of preforms because "such a reference would be to an inherent property of a known composition and as such is not patentable." *Id.* (citations omitted).

Nevertheless, because of the different ingredients, Loken does not teach the semi-metallic claims.

B. Anticipation.

DuPont next asserts that the '211 semi-metallic claims were anticipated by the prior work of Auto Friction and Griffin Wheel and hence were not novel. To be patentable, an invention must be novel. 35 U.S.C. § 101; *see also H. Schwartz, Patent Law and Practice*, ____ (Federal Judicial Center 1988). Comparison with the relevant prior art is required to assess the novelty of an invention. 1 *P. Rosenberg, Patent Law Fundamentals* § 7.01 (2d ed. 1987); *H. Schwartz, supra* at _____. An invention is not novel and is said to be "anticipated" if a single prior art reference discloses every element of the claimed invention. *Lewmar Marine, Inc. v. Barient, Inc.*, 827 F.2d 744, 747 (Fed.Cir.1987), *cert. denied*, ___ U.S. ___, 108 S. Ct. 702, 98 L. Ed. 2d 653

(1988); *In re King*, 801 F.2d 1324, 1326 (Fed.Cir. 1986); *Titanium Metals Corporation of America v. Banner*, 778 F.2d 775, 780 (Fed.Cir.1985).

DuPont asserts that the '211 semi-metallic claims are anticipated by prior unpatented formulations and by a prior patent. The *123 statutory basis for anticipation by an unpatented formulation is 35 U.S.C. § 102(g):

A person shall be entitled to a patent unless

.....

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time to conception by the other.

Anticipation by a prior patent is governed by 35 U.S.C. § 102(e):

A person shall be entitled to a patent unless

(e) the invention was described in a patent granted on an application by another filed in the United States before the invention thereof by the applicant for the patent....

(1) *Auto Friction.*

FDP has accused Auto Friction (AF) of infringing the semi-metallic claims of the '211 patent. A1435. Citing the longrecognized principle that "that which infringes if later, anticipates if earlier," DuPont argues that the earlier work of AF anticipated the '211 patent. *Polaroid Corp. v. Eastman Kodak Co.*, 789 F.2d 1556, 1573 (Fed.Cir.), *cert. denied*, 479 U.S. 850, 107 S. Ct. 178, 93 L. Ed. 2d 114 (1986). Specifically, DuPont points to AF formula B18X88-1 (88-1 formula) which was developed in October, 1979.

DuPont and FDP agree that the 88-1 formula contains the same elements as are set forth in the '211 semi-metallic compositions with one possible exception; the '211 semi-metallic composition calls for "non-asbestos fibers" rather than Kevlar fiber. *See* A1841; DuPont's Opening Brief at 25; FDP's Answering Brief at 14. FDP maintains, therefore, that the '211 patent semi-metallic claims must be construed to exclude Kevlar fiber as the "non-asbestos fiber."

FDP's argument in support of this claim construction is roundabout. FDP reasons that the semi-metallic claims depend from claims 1 and 2 and, therefore, incorporate the three ingredient limitations of claim 1: a fibrous reinforcing material, a thermosetting binder and an effective amount of an aramid polymer pulp fiber. The "fibrous reinforcing material" of claim 1, further

qualified as a "semi-metallic material" in claims 6 and 7, is described there as "non-asbestos fibers." FDP next cites claim 18 which although not in issue on this motion, allegedly aids in construing the semi-metallic claims. Claim 18 also depends from claim 1, thereby incorporating its ingredients, but claim 18 specifies an "aramid polymer fiber," *e.g.*, Kevlar fiber, as part of the composition.

Against this background, FDP invokes the doctrine of claim differentiation to argue that the "fibrous reinforcing material" of claim 1 and the "non-asbestos fibers" of claims 6 and 7 cannot, as a matter of law, embrace aramid polymer fiber. Otherwise, FDP argues, there would be no differentiation between claim 18 and claim 1 (from which claim 18 depends). FDP defines the doctrine of claim differentiation as a presumption that claims "cover different inventions and any interpretation of claims that would make one claim read like another should be avoided." FDP Answering Brief at 97 (citing *Carborundum Co. v. Combustion Engineering, Inc.*, [505 F. Supp. 1011](#) (D.Del. 1981); *Autogiro Company of America v. United States*, 384 F.2d 391 (Ct.Cl.1967)). FDP reasons that to differentiate between claim 1 and claim 18, aramid polymer fiber should be excluded as a "non-asbestos" fiber in claim 1 and in the semi-metallic claims.

We find that FDP incorrectly applies the doctrine. It is true that each claim of a patent, whether dependent or independent, constitutes a separate grant of monopoly so that claims "are to be presumed to cover different inventions." 6 *E. Lipscomb, Walker on Patents* § 21:1, at 264-65 (3d ed. 1987). Based on this presumption, courts developed the doctrine of claim differentiation:

***124** "[T]he limitations of particular claims cannot be read into other claims for the purpose of avoiding infringement. Therefore, where a patent contains both a broad and narrow claim, and suit is brought on the broad claim, the court will not read into the broad claim a limitation not therein expressed but which is expressed in the narrower claim...."

Id. at 264. See also *Yarway Corporation v. EUR-Control USA, Inc.*, 775 F.2d 268, 274 (Fed.Cir.1985).

This doctrine may not be contorted, as FDP would have it, to exclude the limitations (aramid polymer fiber) of a narrow claim (claim 18) from the permissible non-asbestos fibers of every other claim. FDP itself points out that claim 18 is dependent on claim 1 and thus by definition is within its scope rather than exclusive of claim 1. *Chisum on Patents* § 8.06[5] at 8-134 n. 10 ("One cannot infringe a dependent claim without infringing the claim upon which it depends."). We recognize that claims must be distinct. 35 U.S.C. § 112. And it is improper for claims to be repetitious. 1 *L. Horwitz, Patent Office Rules and Practice*, § 75.7. However, "a patentee may claim his invention in several scopes that is, in its broad aspect and its narrow aspect...." *Id.* We construe claim 1, claims 6 and 7, the semi-metallic claims, and claim 18 not as repetitious in any way but as of differing breadth. That claim 1 or the semi-metallic claims may embody an aramid polymer fiber does not render claim 18 repetitious.

Patent claims must be interpreted in light of the specification.^[10] *United States v. Adams*, [383 U.S. 39](#), 49, 86 S. Ct. 708, 713, 15 L. Ed. 2d 572 (1966). FDP refers to the '211 specification as further support for its construction that the semi-metallic claims cannot include Kevlar fiber. The

'211 specification recommends that less than 4.5 weight percent of Kevlar fiber be used. One of the semi-metallic claims, claim 7, provides that non-asbestos fiber should range from 0-25 weight percent.^[11] FDP argues that to construe claim 7, with its upper limit of 25 percent fiber, as encompassing Kevlar fiber would depart from the objective of limiting Kevlar fiber to 4.5 weight percent. FDP Answering Brief at 99 (citing *Stanley Works v. McKinney Manufacturing Co.*, [520 F. Supp. 1101](#), 1110 (D.Del. 1981), *aff'd without opinion*, 681 F.2d 809 (3d Cir. 1982); *Ropat Corp. v. West Bend Co.*, [382 F. Supp. 1030](#), 1036 (N.D.Ill.1974)).

These cases, which plaintiff relies on, establish that the Court must interpret claims with a view to the primary goal of the invention as stated in the specification. This principle, however, is inapposite to FDP's argument. As the patent specification states at col. 6, ln. 67: "In general, it is recommended that a range from about 0.5 to 10 wt % of pulp be utilized with a maximum of about 4% wt [Kevlar] fiber to achieve an acceptable trade-off between strength and processability." A1276-77. This goal would not be impinged by construing Claim 7 as limited to 4.5 percent "non-asbestos fiber" when Kevlar fiber is used as that component.

FDP's next argument focuses on the exemplary non-asbestos fibers of the semi-metallic systems: "non-asbestos fibers such as those of steel, ceramic or carbon". As Kevlar fiber was not listed as an example, FDP argues, the semi-metallic claims cannot be interpreted to allow Kevlar fiber as a non-asbestos fiber. In support of this argument, FDP asserts a general rule of patent claim construction: specific terms "must be given the same meaning in the claims as they have in the underlying specification." *Elfab Corporation v. NCR Corporation*, 204 U.S.P.Q. 999, 1024 (C.D.Cal.1979). FDP apparently seeks to ***125** invoke this rule to limit the term "non-asbestos fiber" to the examples of the specification. In so reasoning, FDP overlooks a fundamental rule of claim construction. Claims in a patent should not be limited strictly to preferred embodiments or specific examples in the specifications.^[12] *Grain Processing Corp. v. American Maize-Products Corporation*, 840 F.2d 902, 910 (Fed.Cir.1988); *Texas Instruments, Inc. v. United States Trade Commission*, 805 F.2d 1558, 1563 (Fed.Cir.1986); *Palumbo v. Don-Joy Co.*, 762 F.2d 969, 977 (Fed.Cir. 1985); *Lemelson v. United States*, 752 F.2d 1538, 1552 (Fed.Cir.1985); and *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1569 (Fed.Cir.1983). According to this precedent, it would be clear error for this Court to interpret "non-asbestos fibers" as limited to the exemplary fibers.

Finally, FDP alleges that the 88-1 formula does not anticipate semi-metallic claim 7 because the 88-1 formula does not come within certain quantity ranges. Specifically, claim 7 calls for:

15-40 wt % of metal powder 4-13 wt % of resin 15-40 wt % of carbonaceous particles

Some of the elements of the 88-1 formula are not within the claim 7 ranges. FDP Answering Brief at 99-100. DuPont responds that there is "nothing critical" in the ranges set forth in claim 7. This is not an adequate response to show no issue of fact as to anticipation. A leading patent treatise states:

When an applicant seeking a patent for a chemical composition claims a range of proportions for various elements thereof, he or she need not demonstrate the criticality of the selection of a

particular range unless such criticality is essential to nonobviousness. *A numerical limitation in a claim cannot be availed of as a distinction over prior art unless the recited boundary "corresponds with physical phenomena, and the patentee has discovered the point at which such physical phenomena occurred."*

3 *E. Lipscomb, Walker on Patents* § 10.13 at 219-20 (3d ed. 1985) (emphasis added) (footnotes omitted). A question exists whether the claim 7 ranges are significant and correspond with novel physical phenomena. If so, then claim 7 is not anticipated by the 88-1 formula.^[13]

In sum, we find that FDP has not presented any properly supported factual issues to counter DuPont's assertion that the 88-1 formula is within the scope of the semi-metallic claims 5 and 6, although a question does exist as to whether the 88-1 formula falls within claim 7. However, a further problem with finding anticipation by the 88-1 formula lies in the gap which occurred in the development of the 88-1 formula by AF between October, 1979, and October, 1981. No work appears to have been done by AF on Kevlar pulp semi-metallic formulations during that period. Looking at the facts in the light most favorable to FDP, there is a question of fact as to whether the 88-1 formula had been reduced to practice in October, 1979, or had been abandoned, suppressed or concealed during the hiatus. For that reason, we cannot find, on DuPont's motion for summary judgment, that the 88-1 formula anticipated the semi-metallic claims of the '211 patent.

(2) Griffin Wheel.

Griffin Wheel (GW), a railroad brake manufacturer, began developing non-asbestos friction materials utilizing Kevlar by 1976. Its Kevlar fiber work culminated in U.S. Patent No. 4,219,452 ('452 patent discussed later in this opinion in conjunction with obviousness.) In May, 1979, DuPont introduced GW to Kevlar pulp. Shortly thereafter GW began making Kevlar pulp containing brakes.

***126** On September 26, 1979, Griffin Wheel prepared formulation WC 9-07-13A (13A formula) from which it made railroad brakes. FDP apparently concedes that claims 5 and 6 are within the 13A formula. A1791. It protests only that one element, kyanite, may not be considered a ceramic powder. FDP Answering Brief at 35. This protest, however, is unsupported and does not refute DuPont's explanation that kyanite is a clay comprising 63 percent alumina which is set forth as an exemplary ceramic in the '211 specification. A1275 (Col. 3, ln 68- Col. 4 ln 1). Regarding claim 7, FDP argues that certain of the 13A ingredients are not within the claim 7 ranges. As we discussed in Section IIB(1) above, at this summary judgment stage, FDP presents a material factual dispute on the question of ingredient ranges, which would preclude summary judgment as to claim 7.

Moreover, as to claim 5 and 6, while we previously decided that the 13A formula was not abandoned, suppressed or concealed, a question also remains whether the 13A formula was reduced to practice. It is undisputed that at least a dozen brake shoes were manufactured from formulation 13A and were subjected to extensive testing. It is also unquestioned that the 13A

formula met 15 of the 17 commercial standards of the American Association of Railroads. However, the import of the two unmet standards to the question of reduction to practice is contested by the parties and also presents a material factual question.

Two other GW formulations are said to anticipate the '211 semi-metallics: formulations WC 9-10-11B and WC 9-10-11C (the 11B and 11C formulas). FDP does not dispute that 11B and 11C formulas disclose the '211 semi-metallic compositions. Moreover, 11B and 11C were tested and found to meet sixteen of the seventeen commercial standards set by the American Association of Railroads. In October, 1979, railroad brakes made from the 11C formula were evaluated in commercial service on the Chicago & Northwestern Railroad. However, an ambiguity exists on the record whether the 11B and 11C formulas were modified before they were tested. *See* B846-847; A1644-46. Factual development would be required to ascertain whether the original 11B and 11C formulas, which disclose the '211 semi-metallic formulations, were reduced to practice.

DuPont also describes GW Patent No. 4,313,869 (the '869 patent) entitled "Composition Friction Element for a Railroad Brake Shoe," as anticipatory. The '869 patent application was filed on May 19, 1980. Again, there is no question that the '869 patent discloses semi-metallic formulations consonant with the '211 formulations. In particular, examples 11 and 12 of the '869 patent are semi-metallic formulations.^[14] Example 11 discloses each ingredient of the 13A formula, and Example 12 discloses the elements of the 11B and 11C formulas. A1283. Further, the '869 specification plainly states that Kevlar pulp is the preferred form of Kevlar. A1282 (Col. 4, in 61-64).

As a result, the '869 patent would certainly be an anticipatory patent if it were established at trial that the '211 patent semi-metallic claims were invented after May 19, 1980. Priority of invention would belong to FDP, however, if it was the first to conceive and thereafter diligently reduced to practice the semi-metallic claims prior to that date. FDP has asserted that conception may have occurred as early as March, 1980. FDP has shown that starting in March, 1980, FDP conducted 29 vehicle tests on 30 compositions allegedly within its definition of semi-metallic. FDP has supplied the declaration and lab notebook of William Vearling, a lab technician who carried out the experimental compositions. *127 Also provided is the declaration of Richard Lemon, an FDP test driver as well as his vehicle test reports. Based on this record, an issue of fact exists whether the '211 patent semi-metallic claims were conceived prior to the '869 patent filing date.

C. Obviousness.

The foregoing demonstrates that semi-metallic formulas existed prior to the '211 patent claims. Further, the '869 patent, filed one and one-half years before the '211 patent, taught Kevlar pulp containing semi-metallic compositions. However, the various questions of fact which were found to exist preclude summary judgment as to each of DuPont's anticipation claims. We turn next to evaluate whether the '211 patent semi-metallic claims were obvious.

Although not anticipated by the prior art, an invention is not patentable if it is obvious:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time to a person having ordinary skill in the art to which said subject matter pertains.

35 U.S.C. § 103. Obviousness is a question of law based on the underlying factual premises enunciated by the Supreme Court in *Graham v. John Deere*:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved need, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or non-obviousness, these inquiries may have relevancy.

[383 U.S. 1](#), 17-18, 86 S. Ct. 684, 694, 15 L. Ed. 2d 545 (1966).

The obviousness of an invention must not be examined with hindsight: "Care must be taken to avoid hindsight reconstruction by using `the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claim in suit.'" *Grain Processing Corporation v. American Maize Products*, 840 F.2d 902, 907 (Fed.Cir.1988) (*quoting Orthopedic Equipment Co. v. U.S.*, 702 F.2d 1005, 1012 (Fed.Cir.1983)). Rather, the inquiry must be whether a hypothetical person skilled in the art at the time would find the claimed invention obvious. This hypothetical person is presumed to know all relevant prior art. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve*, 796 F.2d 443, 448 (Fed.Cir.1986), *cert. denied*, ___ U.S. ___, 108 S. Ct. 85, 98 L. Ed. 2d 47 (1987). Relevant prior art references may be combined but there must be "something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Grain Processing Corporation*, 840 F.2d at 907 (*quoting Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462 (Fed.Cir.1984)).

(1) Level Of Skill In The Art.

According to *Graham*, we must determine the level of ordinary skill in the art of friction material compounding. FDP unconvincingly argues that the level of skill is low. As an example, FDP points out that Vearling and Sochalski, two FDP lab workers who worked on Kevlar experiments did not have bachelors' degrees. However, the record shows that Vearling and Sochalski were not friction material compounders but were lab technicians who carried out the orders of compounders. *See Vearling Deposition*, A2007 ("I was mixing compounds for [Dougherty and Tretina] underneath their instructions"); *Sochalski Deposition*, A2008-09 ("All I done was made the formulations"). There is no dispute that a typical compounder of friction products has at least

a bachelor of science degree in chemistry or chemical *128 engineering, or in a related scientific field. The compounder must have either advanced degrees, practical experience or both. For example, Dougherty and Gallagher, the named inventors of the '211 patent, have respectively a bachelor's degree and a master's degree in chemistry. A1522-23; A1504.

In addition, "evidence adduced in support of the § 102 defenses ... can be probative on the issue of the level of skill in the pertinent art even if it be considered inadequate to establish the existence of a § 102 defense." *Orthopedic Equipment Co. v. United States*, 702 F.2d 1005, 1011 (Fed. Cir.1983). In this regard, we note the uncontroverted fact that Kevlar pulp containing semi-metallic formulations existed prior to the '211 claims. First, in *Friction I* we found that in 1978, DuPont tested a semi-metallic formulation containing Kevlar pulp at the Inland Division of General Motors. 658 F. Supp. at 1012. Similarly, Auto Friction, in 1979, had developed the 88-1 formula which disclosed at least claims 5 and 6 of the '211 patent. Finally, Griffin Wheel's formulations, 11B and 11C, were tested in 1979. While at least for purposes of this summary judgment motion the above formulations are not anticipatory (§ 102(g) defense), the prior development of these formulations speaks to the level of skill in the art of friction compounding. The hypothetical person with ordinary skill could have (and in fact had) readily incorporated Kevlar pulp in semi-metallic formulations.

Based on the above, we find that the level of skill in the art is relatively high, and that, in fact, those practicing it had developed semi-metallic mixes which contained Kevlar pulp but were asbestos-free. We must then go on to examine whether a hypothetical person with such a background and level of skill would find the subject matter of the '211 semi-metallic claims obvious, given the scope and content of the relevant prior art.

(2) The Scope and Content of the Prior Art

The *Graham* analysis requires us to determine the scope and content of the relevant prior art. While the parties disagree as to scope and content, they do not dispute that the following items of prior art are relevant:

(a) Bendix Letter Patent No. 3,856,120 (the '120 patent) entitled "Disc Brake with Semi-Metallic and Organic Friction Pads" issued December 24, 1974. A1291;

(b) The Loken Paper.

(c) The *Research Disclosure Journal*, dated February, 1980;

(d) GW Letter Patent No. 4,219,452 ('452 patent) entitled "Composite Friction Element" issued August 26, 1890. A1285; and

(e) Ferodo, Ltd. Letter Patent No. 4,197,223 ('223 Patent) entitled "Asbestos Free Friction Materials" issued April 8, 1980. A1320.

The parties tirelessly raise numerous points of disagreement as to the scope and content of the prior art but we find no genuine and material disputes are raised as to the relevant teachings of each piece of prior art. We recognize that the entirety of each prior art reference must be considered in an obviousness determination. *In re Wesslau*, 353 F.2d 238, 241 (C.C.P.A. 1965). The *Wesslau* court held:

It is impermissible within the framework of section 103 to pick and choose from any one reference only so much as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art.

Id. However, disputes as to minor details which have no impact on the teaching of the piece of art as a whole will not create a genuine issue of material fact.

The '120 patent discloses a semi-metallic disc brake apparatus containing asbestos. FDP cited the '120 patent as prior art and the patent examiner relied on it to show known art formulations of semi-metallic material. A1355. Set forth below for comparison are the formulations and preferred limits of the '120 and '211 semi-metallic claims, exactly as stated in their respective specifications.

***129**

The '120 Semi-Metallic Formulation.

Ingredient	Percent by Volume of Total Mix	Preferred Limits
Phenolic Resin	20	15-40%
Graphite or Carbon Particles	25	15-40%
Fibers ^[*]	15	0-25%
Ceramic Powders ^[**]	5	2-10%
Metal Powders ^[***]	20	15-40%
Other Modifiers ^[****]	15	0-20%
	<hr style="width: 10%; margin: 0 auto;"/> 100%	

The '211 Semi-Metallic Formulation.

Ingredient	Wt. %
Phenolic Resin	4-13%
Graphite or Carbon Particles	15-40%
Fibers ^[*]	0-25%
Gramic Powders ^[**]	2-10%
Metal Powders ^[***]	15-40%
Other Modifiers ^[****]	0-20%

With 0.5 to 10 wt % of Kevlar pulp

These formulations are virtually identical except that the '120 patent contains asbestos as an exemplary fiber and the '211 patent contains no asbestos but does contain Kevlar pulp.

FDP raises two further distinctions, but neither are material. First, FDP argues that the '120 patent is a one-fiber formulation while the '211 patent requires two types of fiber. FDP cites nothing in the '211 patent claims, specification or file history in support of the existence or significance of this distinction and so we disregard it. Second, in his affidavit, FDP's expert Cosmos Gambardella states that the '120 patent formulation is measured by volume percent while the '211 is measured by weight percent. As differing units of measurement were used, the ranges may not be equivalent. Gambardella provides no comment, however, on whether FDP's ranges are in fact different, and if so, on the significance of this difference as it pertains to obviousness. For lack of further explanation and because of the immediately apparent congruity between the '120 and '211 formulations, we do not find Gambardella's observations go far enough to create a genuine factual issue as to the teaching of the '120 patent.

Next, it is undisputed that the Loken Paper taught the utility of Kevlar fiber and pulp as a replacement for asbestos in the friction industry. The first paragraph of the Loken Paper summarizes this teaching:

Asbestos has characteristics that make it well suited for friction applications including: thermal stability, adequate wear resistance, and strength. However, because occupational exposure to asbestos dust has been shown to cause lung cancer, asbestosis, and mesothelioma, industry is actively developing replacements. *This paper will review work showing the potential of Kevlar aramid fiber to eliminate the need for asbestos in friction products.*

A112 (emphasis added). And, as we observed in *Friction I* Loken taught the use of Kevlar in conventional production methods. 658 F. Supp. at 1010. FDP's only argument is that Loken's teaching was narrower, concerning only a hot mold process. We previously dismissed this contention and will not now reconsider it. 658 F. Supp. at 1007-11.

As to the *Research Disclosure Journal*, both parties agree that this publication disclosed "the fine dispersibility of Kevlar pulp in products." *FDP's Answering Brief* at 130.

Regarding the '452 patent, FDP urges that it does not teach a semi-metallic formulation. A review of the '452 patent suggests that its formulation falls within the '211 semi-metallic claims as approximately 22-23% iron grit is listed in various exemplary formulations. A1289. However, we find that for purposes of the obviousness question we need only consider that the undisputed fact that the '452 patent depicts the inclusion of aramid fibers in asbestos-free friction material formulations using conventional production methods. *130 This much was conceded by FDP during the course of its patent prosecution.

Turning next to the '223 patent, DuPont asserts that it discloses that other forms of pulp (such as wood pulp) "convey integrity and green strength to the material during production" of friction products. A1321. FDP does not deny this teaching. Instead, it argues the '223 patent does not describe a preforming process but rather describes a "slurry method" that does not have the compression step allegedly critical in preforming. The '223 patent teaching, FDP's reasoning continues, does not pertain to the '211 patent methods. We find this argument spurious as Dougherty himself has testified that the term "preform" in the '211 patent does not require a

compression step. A1996. Dougherty admits that the term includes preforms that are extruded as well as those that are molded. With no properly supported further arguments by FDP, we will proceed to view the teaching of the '223 patent as DuPont has presented it.

(3) Comparison Of Prior Art And the Claimed Invention.

The crux of the analysis in *Graham v. John Deere* requires a comparison of the prior art with the claimed invention. We readily find a close comparison such that a friction compounder skilled in the art would find the subject matter of the semi-metallic claims of the '211 patent obvious. The claimed invention employed a known semi-metallic formulation containing asbestos (the '120 patent) and substituted Kevlar pulp, a recognized replacement for asbestos. (Loken and the Research Disclosure Journal). As with other forms of pulp, Kevlar pulp enhanced structural integrity (the '223 patent). The semi-metallic method claims detail the processing of this formulation through conventional production methods (the '452 patent).

Citing several differences between the claimed invention and the prior art, FDP urges that the comparison is not facile. FDP asserts that substitution of Kevlar pulp for asbestos in the '120 patent would result in a one-fiber formulation while the '211 claims are two-fiber formulations. We dismissed this above as a hindsight distinction with no significance on the record.

FDP also argues that the Loken and '120 patent combination do not address its "discovery" that Kevlar pulp enhances the structural integrity of preforms. This argument is unpersuasive to negate obviousness. We found in *Friction I* that preforms and other methods of processing friction materials have been known and used for years with asbestos compositions. 658 F. Supp. at 1010-11. Asbestos had good structural integrity and Kevlar fiber and pulp was a known substitute for asbestos. The substitution of a new material in an old formulation generally does not amount to invention. *Centsable Products, Inc. v. Lemelson*, 591 F.2d 400, 403 (7th Cir.1979) (substitution of Velcro for other less effective adhesive materials is obvious), *cert. denied*, 444 U.S. 840, 100 S. Ct. 79, 62 L. Ed. 2d 52 (1979); *Eltra Corp. v. Basic, Inc.*, 599 F.2d 745, 756-57 (6th Cir. 1979) (selection of carbon black as the preferred additive is not inventive), *cert. denied*, 444 U.S. 942, 100 S. Ct. 297, 62 L. Ed. 2d 308 (1979); *Engelhard Minerals & Chemicals Corporation v. Anglo-American Clays Corporation*, [586 F. Supp. 435](#), 446 (M.D.Ga.1984) (substitution of hard clay for soft clay was not obvious as it produced the unexpected result of producing a bright pigment). This rule applies "even though the new material more satisfactorily serves or performs the intended function." *AMP, Inc. v. Burndy Corp.*, 332 F.2d 236, 239 (3d Cir.), *cert. denied*, 379 U.S. 844, 85 S. Ct. 84, 13 L. Ed. 2d 49 (1964).

We recognize that "this general rule is based on the assumption that the material substituted performs in a *well known* or *expected* manner." *Id.* (citations omitted). Thus, a substitution that produces startling or unexpected results is not obvious. *Id.* Recalling that asbestos conveyed good structural integrity to friction products and that Loken and the *Research Disclosure Journal* taught that Kevlar was an asbestos substitute, we cannot find that FDP's use of Kevlar pulp in *131 semi-metallic formulations produced startling or unexpected results.

We also recognize that for a combination of prior art teachings to render the '211 semi-metallic claims obvious, there must be "some teaching, suggestion or incentive supporting the combination." *In re Geiger*, 815 F.2d 686, 688 (Fed.Cir.1987) (citation omitted). Here, there is no question that the harmful effects of asbestos created a keen incentive to replace asbestos containing formulations with a suitable substitute. DuPont promoted Kevlar as an asbestos substitute to potential customers in the friction industry through publications and presentations. Indeed, DuPont made such a presentation to Dougherty and Gallagher on November 1, 1979, their alleged date of invention for the organic and generic claims, to discuss, among other things, the developing use of Kevlar in friction applications. A1737.^[15]

(4) Secondary Considerations.

Although we conclude that the subject matter of the '211 semi-metallic claims is obvious, we may not grant summary judgment before we examine secondary considerations of obviousness. *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556-57 (Fed.Cir.1985); *Acoustiflex Corp. v. Owens-Corning Fiberglass Corp.*, [572 F. Supp. 936](#), 938 (N.D.Ill.1983). Secondary considerations which support obviousness include whether the claimed invention met with commercial success, whether the invention solved a long felt industry need and whether through creating the claimed invention, the inventor succeeded where others had failed. These considerations may provide objective indicia of obviousness to be reviewed along with the subjective determination of whether a hypothetical person skilled in the art would find the invention obvious. *Hodosh v. Block Drug Co. Inc.*, 786 F.2d 1136, 1143-44 (Fed.Cir.), *cert. denied*, 479 U.S. 827, 107 S. Ct. 106, 93 L. Ed. 2d 55 (1986).

Secondary considerations are relevant to a determination of obviousness only if a nexus is established between the claims of the invention and the secondary factors. *Revlon, Inc.*, 602 F. Supp. at 1096. For example, where the success of an invention is due to advertising, good business sense, the prior art, etc., rather than the advantages inherent in the discovery, it is irrelevant to a determination of obviousness. *Id.*

To assert commercial success as a secondary factor, FDP makes a bald statement that by 1988, its sales of its semi-metallic friction products will comprise 50 percent of the company's business. No supporting data are supplied. Further, FDP makes no showing that there exists a nexus between the alleged commercial success of its invention and its non-obviousness. The projected commercial success of the '211 semi-metallic claims, even if proven true, may be attributable to increased advertising expenditures or other causes. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367 (Fed.Cir.1986), *cert. denied*, ___ U.S. ___, 107 S. Ct. 1606, 94 L. Ed. 2d 792 (1987). Also, FDP speaks only of its sales in 1988. More probative of nonobviousness would be evidence of commercial success immediately following the patenting of the invention. *Id.* at 1382.

FDP also points to the commercial success of some of its competitors with their Kevlar pulp containing friction products. Particularly, FDP emphasizes the work of Carlisle Corporation as somehow indirectly demonstrating the commercial success of the '211 semi-metallic claims.

FDP's logic appears to be as follows: (1) Carlisle needed to produce a non-asbestos brake to satisfy its customers; (2) this need was ultimately resolved by a discovery by its chief chemist, Searfoss, that Kevlar *132 pulp could be used successfully as an asbestos substitute in the manufacture of preforms; (3) Carlisle advertises this discovery as "revolutionary" and as a "technological breakthrough" (*See* FDP Answering Brief at 69); (4) Carlisle's Kevlar pulp preforms were commercially successful; and (5) therefore, because Carlisle's "invention" was allegedly the same as FDP's, we should consider that success as evidence of FDP's commercial success.

We find no legal authority or factual connection that would allow us to impute the commercial success of Carlisle to FDP for purposes of determining obviousness. In any event, the Carlisle activities, if they are relevant at all, suggest the obviousness of the '211 patent. In 1981, Carlisle sought a patent for the Searfoss discovery. The patent was *rejected* on the grounds of obviousness in view of the Loken Paper. A1246.

According to FDP, others in the friction industry failed to recognize the effect of Kevlar pulp on preforms. FDP Answering Brief at 139-40. Through its recognition of this effect, FDP claims that it answered long felt but unsolved needs of the industry. FDP cites nothing on the record, however, to directly support its claim that the industry had a need to recognize the effect of Kevlar pulp on preforms. The record instead abundantly demonstrates that the long felt need in the friction industry was for an asbestos replacement. Once DuPont introduced Kevlar pulp, thus satisfying a need for an asbestos substitute, companies such as Griffin Wheel, Auto Friction and Carlisle immediately recognized its benefit.

In sum, we find that we have not been apprised of probative objective indicia of the non-obviousness of the '211 semi-metallic claims.

The '211 semi-metallic claims simply do not amount to a patentable invention even in view of the presumption of validity which is attached to those claims. The prosecution history of the '211 patent shows that all of the '211 claims were initially rejected by the patent examiner. A78. The examiner stated that although the references, including the GW '452 patent, used aramid fiber and did not specifically point to the use of Kevlar pulp, nothing unobvious or unexpected had been shown by the use of Kevlar pulp. A78. In response, FDP argued that the use of Kevlar pulp produces "the highly unobvious and unexpected improvement in preform structural integrity obtained with the use of pulp...." A94. Thereafter, the '211 patent issued. However, the examiner did not evaluate this response in the proper context in view of the fact that the Loken Paper, the Research Disclosure Journal and the '223 patent were not cited as prior art references in the '211 application. *See Atlas Powder Co. v. E.I. DuPont de Nemours*, 750 F.2d 1569, 1573 (Fed.Cir.1984) ("[T]he introduction of prior art not before the PTO may facilitate meeting the challenger's ability to meet the burden of proof of invalidity...."). In any event, even assuming that FDP was the first to recognize certain structural integrity properties of Kevlar pulp preforms, that recognition does not amount to an unexpected and patentable insight.

D. Indefiniteness of the '211 Patent Claims.

Because we have found the semi-metallic claims of the '211 patent to be invalid under 35 U.S.C. § 103 due to obviousness, we will not go on to rule on DuPont's assertion that the claims of the '211 patent are indefinite and, therefore, invalid under 35 U.S.C. § 112. Moreover, DuPont's indefiniteness argument seems somewhat entwined in non-infringement and claim validity arguments. In other words, which came first, the chicken or the egg is FDP promoting the inclusion of a particular composition within one category of claims rather than another to avoid prior rulings of invalidity of certain claims or is the make-up of the composition in fact included within the formulations of both categories? Since we don't now have to enter this morass, we will refrain from doing so.

E. Inequitable Conduct.

(1) Factual Background.

Inventors who seek patent protection have a duty of candor and good faith *133 to the Patent Office. That duty includes an obligation to disclose material prior art of which the inventors were aware. 37 C.F.R. § 1.56(a). Violation of this duty constitutes inequitable conduct which renders all claims of the patent unenforceable. *A.B. Dick Co. v. Burroughs Corp.*, 798 F.2d 1392 (Fed.Cir.1986). DuPont has brought an inequitable conduct claim against FDP. DuPont claims that FDP did not disclose to the PTO the recommendations made by DuPont regarding Kevlar pulp. DuPont supplied FDP with Kevlar pulp and recommended its use over Kevlar fiber as a cost saving measure. Nonetheless, FDP represented to the Patent Office that nothing in the prior art suggested the substitution of Kevlar pulp in friction materials. A1350. Additionally, on November 1, 1979, FDP's alleged date of invention for its generic and organic claims, Dr. Loken and others from DuPont visited FDP and made presentations on Kevlar pulp and its processing. A1723-37; A1738-39. Neither, Dougherty nor Gallagher, the named inventors of the '211 patent, disclosed that presentation to their patent attorney or to the Patent Office. A1601.

Nor did they disclose to the PTO the April, 1980, Loken Paper in spite of the fact that on July 14, 1982, less than one month before the original rejection of the '211 patent by the PTO, DuPont's Kevlar salesman, Mr. Snyder, visited Dougherty and his assistant, Viventi. A1768. Snyder's visit was part of DuPont's customary follow-up with its customers. By this time, FDP had started to use Kevlar pulp for preforming in one of its brake formulations. FDP's reason for using Kevlar pulp, however, was a secret outside of FDP. A1530-31; A1887-90. Dougherty testified in his deposition that he recalled this visit because Viventi violated his trust "by telling Mr. Snyder that the only thing that Kevlar was good for was for preforming." A1535. In other words, Viventi disclosed FDP's "secret" to DuPont. As FDP admits, Snyder then told Viventi that he would send FDP a copy of the Loken Paper for FDP's comments. The next day, he sent copies of the Loken Paper to Viventi and Dougherty. A1771-80. Dougherty admitted receiving the Loken Paper shortly after his meeting with Snyder. A1533. He testified, however, that he did not read it. A1534.

On August 6, 1982, Dougherty and Gallagher responded to the Patent Office rejection of the '211 patent and still did not disclose the Loken Paper or the November 11, 1979, DuPont presentation, or in fact any of DuPont's recommendations regarding Kevlar pulp.

(2) Legal Standard.

Inequitable conduct before the PTO must be proved by clear and convincing evidence of an intentional misrepresentation or withholding of a material fact. *Grain Processing Corp.*, 840 F.2d at 907. Materiality and intent are factual questions. Once materiality and intent are established, the court must balance "the materiality of the withheld prior art against the level of intent with which the prior art was withheld from the Patent and Trademark Office (PTO)...." *Revlon, Inc. v. Carson Products Co.*, 803 F.2d 676, 679 (Fed.Cir.1986). Inequitable conduct does not arise where it is shown that the patent applicant did not know of the material undisclosed prior art. *FMC Corp. v. The Manitowoc Co., Inc.*, 835 F.2d 1411, 1415 (Fed.Cir.1987). However, as the Federal Circuit has recently reiterated, "one should not be able to cultivate ignorance, or disregard numerous warnings that material prior information or prior art may exist merely to avoid actual knowledge of that information or prior art." *FMC Corp. v. Hennessy Industries*, 836 F.2d 521, 526 n. 6 (Fed.Cir.1987).

FDP apparently now argues that Dougherty and Gallagher did not recall the November 1, 1979, DuPont presentation on Kevlar fiber and pulp (FDP Answering Brief, p. 80-82) and that following Snyder's sending Dougherty the Loken paper in July, 1982, Dougherty put that paper in one of his file drawers without reading it (FDP Answering Brief, p. 90-94). Viewing these facts in the light most favorable to FDP, therefore, we find a question of fact exists on the issue of intentional misrepresentation *134 or withholding of a material fact. The question of FDP's intent in failing to disclose the DuPont presentation, which was made to FDP on the very same date as FDP's claimed invention date for the organic and generic claims, goes to state of mind and would have to be determined at trial. Similarly, the question whether FDP "cultivated ignorance" of the Loken Paper goes to state of mind. Resolution of DuPont's claim of inequitable conduct must await trial.

F. FDP's Cross-Motion.

We have held, viewing the material facts of this case favorably to FDP, that the '211 patent is invalid. In *Friction I*, we found the generic and organic claims to have been anticipated. We now find the semi-metallic claims to be obvious. This leaves us with nothing to resolve in FDP's favor. Furthermore, even if there were claims still extant, we would have to deny FDP's motion because of material issues of fact. Looking at the facts of record in the light most favorable to DuPont, DuPont is the inventor of the concept of using Kevlar pulp as a substitute for asbestos in friction materials. DuPont scientists noted that friction formulations incorporating Kevlar pulp "knit well" and that Kevlar formulations could be processed by the same techniques employed with asbestos friction materials. Nuturn, Griffin Wheel and Auto Friction anticipated the '211

patent. Dougherty and Gallagher deliberately withheld relevant prior art from the PTO. These are only the most evident issues of fact which must be considered with FDP's cross-motion. Their existence would require denial of that motion.

III. CONCLUSION.

For the reasons stated above, we will grant DuPont's motion for summary judgment on the ground that the semi-metallic claims of the '211 patent are invalid because they are obvious. We will deny DuPont's motion based on FDP's inequitable conduct before the PTO because we find there are issues of material fact. For the same reasons, we will deny FDP's cross-motion and DuPont's motion on the grounds of anticipation and indefiniteness of the semi-metallic claims.

An appropriate order will follow.

NOTES

[1] In an earlier decision in this case, we held that the prior art publication of the Loken paper, with the formula disclosed therein, invalidated the generic and organic non-asbestos claims of the '211 patent under 35 U.S.C. § 102(b). *Friction Division Products, Inc. v. E.I. DuPont de Nemours & Co.*, [658 F. Supp. 998](#) (D.Del.1987).

[2] Page references are to Appendices.

[3] Counsel for DuPont at oral argument described his attempts to obtain a definite date of invention for the semi-metallic claims as "like trying to nail jello to the wall." (Transcript, April 21, 1987, p. 3).

[4] Two dates in the invention's history are critical under the United States patent system: the date of conception and the date of reduction to practice. Conception "involves the formulation in the mind of the inventor, of the complete means for solving a problem." 1 *P. Rosenberg, Patent Law Fundamentals* § 10.01[1] (2d ed. 1987). Reduction to practice is the physical embodiment of the concept. Actual reduction to practice consists of three elements:

- (1) production of the claimed composition;
- (2) recognition of its properties; and
- (3) identification of its specific practical utility.

Friction I, 658 F. Supp. at 1012 (quoting *Hercules, Inc. v. Exxon Corp.*, [497 F. Supp. 661](#), 668 (D.Del. 1980)). Constructive reduction to practice occurs with the formal filing of the patent application in the Patent and Trademark Office. *P. Rosenberg, supra* at 10.01[2]. Under our patent system, "priority of invention belongs to the party who was first to reduce to practice (whether actually or constructively), unless the invention (1) was earlier conceived by another

and 2) such other party exercised continued diligence from the time of his own conception until he reduced the invention to practice (whether actually or constructively.)" *Id.* at 10.01[3], p. 10-14.5.

[5] In its opening brief on its renewed motion for summary judgment, DuPont argues that FDP should be constrained to the last date of the period which it claims as the invention period. In support of this, DuPont cites 37 C.F.R. 1.629(a) and *Haultain v. DeWindt*, 254 F.2d 141, 142 (C.C.P.A.1958). Neither authority supports DuPont's proposition. Regulation 1.629(a) appears in Subpart E which "governs the procedure in patent interferences in the PTO [Patent Trademark Office]." A party to an interference may file a "preliminary statement." 37 C.F.R. 1.621. The preliminary statement must describe when the invention was made and reduced to practice. 37 C.F.R. 1.623. A party is held to any dates alleged in the preliminary statement. 37 C.F.R. 1.629. The present case is not a patent interference and does not involve a preliminary statement. In *Haultain*, a patent interference proceeding, the court held that "where testimony merely places the acts within a stated time period, the inventor has not established a date for his activities earlier than the last day of the period." 254 F.2d at 142. This precedent cannot be converted to a rule that in a patent lawsuit a party may not specify a time period as encompassing the date of conception and reduction to practice that he may prove at trial.

[6] The Court must resolve the scope of the '211 semi-metallic claims as a matter of law. *Freeman v. Minnesota Mining and Manufacturing*, [675 F. Supp. 877](#), 891 (D.Del.1987) (citing *George v. Honda Motor Co., Ltd.*, 802 F.2d 432, 434 (Fed.Cir.1986); *Molinaro v. Fannon/Courier Corp.*, 745 F.2d 651, 654 (Fed.Cir.1984)). Although a question of law, underlying factual questions may exist:

When a claim is in dispute, however, it is *always* necessary to look at certain extrinsic evidence, namely, the specification, the prosecution history, and the other claims ... Although claim construction (what its scope is) is a legal conclusion, *underlying factual disputes may arise....* If complex scientific principles are involved or expert testimony is needed to explain a disputed term, for example.... 675 F. Supp. at 891 (*quoting Howes v. Medical Components, Inc.*, 814 F.2d 638, 643 (Fed.Cir.1987)) (citations omitted).

[7] The Court in *Anderson* reiterates that the "genuine issue" standard for a motion for summary judgment "mirrors the standard for a directed verdict under Federal Rule Civil Procedure 50(a)...." 477 U.S. at 250, 106 S. Ct. at 2511. Under Rule 50(a), "the trial judge must direct a verdict if, under the governing law, there can be but one reasonable conclusion as to the verdict." *Id.* (citation omitted).

[8] This section provides that a person shall not be entitled to a patent if:

(b) the invention was patented or described in a printed publication in this or a foreign country ... more than one year prior to the date of the application for patent in the United States....

35 U.S.C. § 102(b).

[9] DuPont argues that the "cashew friction particles" of the Loken formula qualify as the "carbonaceous particles" required in claims 6 and 7. However, since the Loken formula does not contain one of the required claim 6 and 7 elements, *i.e.*, "metal powder", we will not be concerned at this time with whether or not it does in fact contain "carbonaceous particles."

[10] A patent application must contain a specification. 35 U.S.C. § 111. The specification includes a written description of the invention complete enough to allow a person skilled in the art to make and use the invention. 35 U.S.C. § 112. The patent claims, however, and not the specification, set forth the legally controlling metes and bounds of the invention. 35 U.S.C. § 112; *In re Vamco Machine and Tool, Inc.*, 752 F.2d 1564, 1577, n. 5 (Fed.Cir.1985).

[11] Claim 7 is the only semi-metallic claim stating a quantity limitation by the non-asbestos fiber.

[12] This rule protects an inventor who obtains a patent. The invention need not disclose, through examples, every possible embodiment of his inventive concept to protect that concept. 2 *P. Rosenberg, Patent Law Fundamentals* § 14.09 n. 70 (2d ed. 1987).

[13] At this juncture, we think it likely that the claim 7 ranges are not critical because the only two products FDP accuses of infringing claim 7, Nuturn Products 4 and 7, do not fall within the claim 7 ranges.

[14] To argue that its semi-metallic claims are not within the '869 patent example 12, FDP claims that example 12 does not call for two fibers as does, allegedly, the '211 claims. *FDP Answering Brief* at 35. FDP gives no further insight into the significance of the one-fiber/two fiber distinction. Our review of the record indicates that this is a distinction made with hindsight which was in no way material to the '211 patent prosecution. FDP provides no support to contradict this finding. We, therefore, find this distinction irrelevant.

[*] Steel, Asbestos, Ceramic or Carbon fibers with steel being preferred.

[**] Magnesium Oxide, Zircon, Mullite, Alumina

[***] Iron, Copper, Brass, Stainless Steel with Iron being preferred

[****] Elastomers, inorganic wear fillers (Whiting)

[*] steel, ceramic or carbon fibers

[**] magnesium oxide, zircon, mullite, alumina

[***] iron, copper, brass, stainless steel

[****] elastomers, inorganic wear fillers

[15] FDP supplied the Declaration of Cosmo Bruce Gambardella to support its claim of nonobviousness. B947 (¶¶ 16-17). In his declaration, Gambardella proffers all of the same arguments that FDP asserts in its answering brief and which we address above. Assuming Gambardella is competent to testify to the matters stated in his affidavit, he does not set forth specific facts within his personal knowledge which create issues of material fact for trial thereby precluding summary judgment. Fed.R. Civ.P. 56(e). *See Freeman*, 675 F. Supp. at 886-87 (affidavit in the form of opinion or g