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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* JOHN E. HAYES,  
ALBERT MAGNOTTA, and NIGEL BARKSBY

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Appeal 2011-006400  
Application 11/546,882  
Technology Center 1700

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Before PETER F. KRATZ, CATHERINE Q. TIMM, and  
JEFFREY T. SMITH, *Administrative Patent Judges*.

KRATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-20. We have jurisdiction pursuant to 35 U.S.C. § 6.

Appellants' claimed invention is directed to immiscible polyurethane composite formation formulations (compositions) and processes for preparing a fiber reinforced polyurethane composite using such a formulation via pultrusion. According to Appellants (Spec. 1, ll. 13-18),

Pultrusion is a manufacturing process for producing continuous lengths of fiber reinforced plastic ("FRP") structural shapes. Raw materials include a liquid resin mixture (containing resin, fillers and specialized additives) and reinforcing fibers. The process involves pulling these raw materials, rather than pushing as is the case in extrusion, through a heated steel forming die using a continuous pulling device.

Claims 1, 7, and 14 are illustrative and reproduced below:

1. A reaction system for the preparation of a fiber reinforced composite by a pultrusion process comprising:

continuous fiber reinforcing material; and

an immiscible polyurethane-forming formulation which undergoes essentially no polymerization under injection conditions in the pultrusion process comprising

a polyisocyanate component containing at least one polyisocyanate, and

an isocyanate-reactive component containing at least one isocyanate-reactive compound.

7. A pultrusion process for preparing a fiber reinforced polyurethane composite, the process comprising:

continuously pulling a roving or tow of continuous fiber reinforcing material successively through an impregnation chamber and a die;

continuously feeding an immiscible polyurethane formulation comprising a polyisocyanate component containing at least one polyisocyanate and an isocyanate-reactive component containing at least one isocyanate-reactive compound to the impregnation chamber;

contacting the fiber reinforcing material with the formulation in the impregnation chamber such that substantially complete wetting of the material by the formulation occurs;

directing the fiber reinforcing material through a die heated to reaction temperature to form a solid composite; and

drawing the composite from the die,

wherein conditions in the impregnation chamber are such that substantially no polymerization takes place.

14. In a process for preparing a fiber reinforced polyurethane composite by pultrusion, the improvement comprising including a phase separated polyurethane formulation which undergoes essentially no polymerization under injection conditions in the pultrusion process.

The Examiner relies on the following prior art references as evidence in rejecting the appealed claims:

Joshi et al.	US 2004/0106726 A1	June 3, 2004
Brown et al.	US 2007/0113983 A1	May 24, 2007

Claims 1, 3-5, 7, 9-11, 13-15, and 17-19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Brown. Claims 2, 6, 8, 12, 16,

and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brown in view of Joshi.<sup>1</sup>

We affirm the stated anticipation and obviousness rejections based on the fact findings made by the Examiner and for substantially the reasons as set forth by the Examiner (Ans. 3-11). We offer the following for emphasis.

Concerning the anticipation rejections over Brown, Appellants argue the rejected claims together as a group with respect to each of the stated anticipation rejections. Accordingly, we select claims 1, 7, and 14 as the representative claims on which we decide this appeal as to the separate rejections. However, Appellants' arguments are substantially the same for each of the stated rejections. Consequently, our discussion as to the shortcomings of the common arguments with respect to any one of these representative claims applies, *mutatis mutandis*, to the others.

As for representative claim 1, the Examiner has reasonably found that Brown describes a reaction system (composition) for forming a fiber reinforced polyurethane composite via pultrusion wherein an immiscible formulation comprising isocyanate and polyol components is employed, wherein the components "do not begin to react/polymerize until after the injection/impregnation step, as the reaction is initiated from the heat applied in the curing die (Paragraphs 34 and 49)" (Ans. 4).

With respect to representative claim 7, the Examiner has found that Brown describes "a continuous pultrusion process for producing a polyurethane composite (Paragraphs 20, 24, and 92)" wherein "reinforcing

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<sup>1</sup> The Examiner presents three separate anticipation rejections over Brown and three separate obviousness rejections over Brown and Joshi, which separate rejections we have consolidated into one anticipation rejection and one obviousness rejection for convenience.

materials, e.g. glass fibers, are provided on spools such that the materials are fed into the next step without interference (Paragraphs 59 and 61),” wherein the “fiber tows and resin precursors are introduced into the impregnation die (Paragraph 67),” and “wherein the resin precursor may be an immiscible polyurethane- forming blend comprising an isocyanate and polyol component (Paragraph 49)” (*id.*).

According to the Examiner, Brown’s “impregnation die is configured such that individual filaments with each fiber tow are thoroughly mixed with the resin (Paragraph 67), i.e. complete wetting of the fibers occurs” then, the “wetted resin-fiber mass then enters a curing die wherein heat is applied, thus beginning the reaction/polymerization of the polyol and isocyanate components (Paragraphs 49 and 85)” and the resultant composite exits from the die (*id.* at 4-5).

Regarding representative claim 14, the Examiner finds that Brown describes a method, in which, (1) “reinforcing materials, e.g. glass fibers, are provided on spools such that the materials are fed into the impregnation die without interference (Paragraph[] 59),” (2) “an immiscible polyurethane formulation comprising an isocyanate, such as diphenylmethane diisocyanate, and a polyol component” is employed and (3) polyurethane components “do not begin to react/polymerize until after the injection/impregnation step, as the reaction is initiated from the heat applied in the curing die (Paragraphs 34 and 49)” (*id.* at 5).

Based on these findings, we agree with the Examiner that Brown anticipates the subject matter of the representative claims 1, 7, and 14.

In this regard, we note that the argued limitation in representative 1 that the pultrusion formulation undergoes no polymerization under injection

conditions in the process is an intended use limitation tying the claimed formulation to injection process conditions under which it may be used and is entitled to little weight. A mere statement of a new use for an otherwise old or obvious composition cannot render a claim to the composition patentable. *In re Zierden*, 411 F.2d 1325, 1328 (CCPA 1969).

In addition, and as for each of the representative claims, we further agree with the Examiner that Brown furnishes a description of subject matter that is embraced by this argued limitation by describing the reaction as commencing in the heated curing die 160 which is downstream of the injection die 150 (*id.* at 4-5, and 8-11; Brown, paras. 0049, 0059, 0061, 0067, 0085-0087).

It is worth noting that Appellants have not proffered an upper limit for the amount of polymerization reaction that the claim term “essentially no polymerization” and/or “substantially no polymerization” in the injection die encompass. Appellants state that “[t]he conditions in the injection die are such that little, or more preferably no polymerization of the immiscible polyurethane formulation will occur” (Spec. 8, ll. 26-28). Consequently, the claimed qualifiers “essentially” and/or “substantially” seem to be measured by the term “little,” leaving the claims open to a broadest reasonable construction when read in light of the subject Specification that would permit some polymerization in the injection die.

Consequently for the fact findings, reasons, and rebuttal set forth in the Examiner’s Answer, we are not persuaded of substantive error in the Examiner’s anticipation rejections by the arguments presented by Appellants in the Appeal Brief.

Appellants contend that Brown discloses that the polymerization is up to 50 percent complete in Brown prior to entry into the curing die (Reply Br. 2). To support this contention, Appellants rely on paragraph 0049 of Brown, which according to Appellants, relates to the extent of the reaction in the curing die (150) up to which reaction degree the reactant mixture may maintain its liquid state (*id.*). Appellants' contention is meritless. This is because it is based on a reading of Brown's disclosure that, at best, is strained and unsupported by the cited paragraph of Brown's disclosure (Reply Br. 2).

Accordingly, we shall sustain the Examiner's anticipation rejections.

As for the separate arguments against the several dependent claims that are rejected as being obvious over a combination of Brown and Joshi, Appellants do not contest the Examiner's reliance on Joshi for teaching sources of reinforcing fiber and cross-linkers that correspond to the additional limitation of these claims as the Examiner has found; rather, Appellants argue that Joshi does not teach the argued injection conditions under which essentially no polymerization occurs (App. Br. 10-18; Reply Br. 3-4). However, the Examiner relies on Brown for this teaching.

For reasons stated by the Examiner, we are not persuaded of substantive error in the Examiner's obviousness rejection of the dependent claims based on the arguments presented respecting the Examiner's obviousness rejections (Ans. 6-8, and 11).

It follows that we shall sustain the Examiner's obviousness rejections, on this record.

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ORDER

The Examiner's decision to reject the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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