

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* KARL W. HAIDER, NEIL H. NODELMAN, JOHN P.  
FORSYTHE, AND BRIAN R. SUDDABY,  
Appellants

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Appeal 2008-0633  
Application 10/922,399<sup>1</sup>  
Technology Center 1700

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Decided: August 5, 2008

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Before CAROL A. SPIEGEL, ROMULO H. DELMENDO, and  
MARK NAGUMO, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL

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<sup>1</sup> Application 10/922,399 filed 20 August 2004, titled *Process for Preparing Closed-Cell Water-Blown Rigid Polyurethane Foams Having Improved Mechanical Properties*, the disclosure of which is referred to as the “399 Specification” and cited as “Spec.” The real party in interest is listed as Bayer MaterialScience LLC. (Revised Appeal Brief under 37 C.F.R. § 1.192, filed 24 January 2007 (“Br.”), 1.)

**A. Introduction**

Karl W. Haider, Neil H. Nodelman, John P. Forsythe, and Brian R. Suddaby (“Haider”) timely appeal under 35 U.S.C. § 134(a) from the final rejection<sup>2</sup> of claims 13-19, which are all of the pending claims. We AFFIRM.

The subject matter on appeal relates to mixtures said to be useful for forming polyurethane foams. According to the 399 Specification, the mixtures can be processed with water as an environmentally benign blowing agent (replacing the now banned chlorofluorocarbons and their replacements, hydrofluorocarbons) to provide closed-cell rigid polyurethane foams having improved compressive strength and improved adhesion to substrates such as aluminum or acrylonitrile/butadiene/styrene (“ABS”). Such foams are said to be particularly useful in picnic coolers, vending machines, entry doors, etc.

The sole independent claim is representative of the issues necessary to decide this appeal.

Claim 13

A polyurethane-foam forming mixture comprising:

(a) at least one polyol mixture comprising:

(i) at least one polymer polyol;

(ii) at least one polyol having a hydroxyl value within the range of from about 200 to about 800; and

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<sup>2</sup> Office Action mailed 17 May 2006 (“Final Rejection”); the Notice of Appeal was filed 18 August 2006.

- (iii) optionally, at least one polyol having a hydroxyl value within the range of from about 25 to about 115;
  - (b) at least one polymeric isocyanate and/or a prepolymer thereof;
  - (c) optionally, at least one catalyst;
  - (d) water; and
  - (e) optionally, at least one additive or auxiliary agent
- wherein foam made from the mixture has
- a perpendicular compressive strength within the range of from about 35 to about 105 lbs/in<sup>2</sup> and
  - a tensile adhesion greater than 105 lbs/in<sup>2</sup> and
  - wherein the foam has a solids content of from about 5.4 to 12.1 wt%, based on the weight of the foam.

(Claims App., Br. 13; indentation added.)

Claims 14 through 19 each depend directly from claim 13.

The Examiner has maintained the following grounds of rejection<sup>3</sup>:

- A. Claims 13-19 stand rejected under 35 U.S.C. § 112(1) as lacking an adequate written description. (Ans. 3.)
- B. Claims 13-19 stand rejected under 35 U.S.C. § 102(b) in view of Hinz.<sup>4</sup> (Ans. 4-5.)
- C. Claims 13-19 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Hinz and Perry.<sup>5</sup> (Ans. 5-7.)

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<sup>3</sup> Examiner's Answer mailed 15 May 2007 ("Ans.").

<sup>4</sup> Werner Hinz *et al.*, *Production of Rigid Polyurethane Foams*, U.S. Patent 5,552,450 (1996).

<sup>5</sup> Mark J. Perry *et al.*, *Energy Management Polyurethane Rigid Foams with High Recovery*, U.S. Patent 6,127,443 (2000).

D. Claims 13 and 15-19 stand rejected under 35 U.S.C. § 103(a) in view of Perry. (Ans. 7-8.)

**B. Findings of Fact (FF)**

Findings of fact throughout this Decision are supported by a preponderance of the evidence of record.

399 Specification

1. The 399 Specification states that “[a]ny polymer polyol known in the art can be used as component i) in the polyol mixture of the present invention.” (Spec. 4:7-8.)

2. The 399 Specification provides the following definition of the term “polymer polyol”: “[p]olymer polyols are dispersions of polymer solids in a polyol.” (Spec. 4:7-8.)

3. According to the 399 Specification, “SAN polymer polyols are typically prepared by the *in situ* polymerization of one or more vinyl monomers, preferably acrylonitrile and styrene, in a polyol, preferably, a polyether polyol, having a minor amount of natural or induced unsaturation.” (Spec. 4:12-15.)

4. The 399 Specification cites U.S. Patents 3,304,273, 3,383,351, and 3,523,093 as the first three of some fifteen patents said to describe the preparation of SAN polymer polyols said to be useful in the disclosed invention. (Spec. 4:12-19.)

5. In the words of the 399 Specification, “[a]ny polyol known in the art which has a hydroxyl value within the range of from about 200 to about 800

can be used as component ii) in the polyol mixture of the present invention.”  
(Spec. 6:1-3.)

6. The 399 Specification states that polyester polyol useful as component ii) have “hydroxyl number values within the range of from about 200 to about 800 mg KOH/g, preferably, from about 200 to about 600 mg KOH/g.”  
(Spec. 6:9-11.)

7. According to the 399 Specification, “[a]ny polymeric isocyanates and/or prepolymers thereof can be used in the present invention.”  
(Spec. 9:23-24.)

8. Tables 2 and 3 provide compositions and “solids in foam (wt.%)” values for Examples 1-4 and 6. (Spec. 16-17.)

9. Example 1 (polyol B, polymer polyol B, isocyanate A) is said to have 12.1 wt% solids in foam. (Spec. 16.)

10. Example 3 (polyol B, polymer polyol A, isocyanate A) is said to have 5.4 wt% solids in foam. (Spec. 16.)

Hinz

11. Hinz describes the production of rigid polyurethane foams by reacting, *inter alia*:

a) polyisocyanates with

b) at least one relatively high-molecular weight compound containing at least two reactive hydrogen atoms such as polyoxypropylene-polyols and/or polyoxyethylene-polyoxypropylene-polyols having a hydroxyl number of from 385 to 410 mg of KOH/g and

d) a blowing agent.

(Hinz 2:10-35.)

12. According to Hinz, “[i]n addition to the polyether-ols used according to the invention, it is also possible to use further relatively high-molecular-weight compounds containing at least two reactive hydrogen atoms.”

(Hinz 5:30-33.)

13. In Hinz’s words, “[p]reference is given to polyester-polyols and/or polyether-polyols. The hydroxyl number of the polyhydroxyl compounds is generally from 150 to 850, preferably from 200 to 600.” (Hinz 5:42-45.)

14. Hinz instructs further:

Other suitable polyether-polyols are polymer-modified polyether-polyols, preferably graft polyether-polyols, in particular those based on styrene and/or acrylonitrile and prepared by in-situ polymerization of acrylonitrile, styrene or preferably mixtures of styrene and acrylonitrile . . . by a method similar to that of . . . U.S. 3,304,273, 3,383,351, and 3,523,093 . . . .

(Hinz 7:19-28.)

15. Hinz indicates that water can be added as a blowing agent.

(Hinz 8:47-49.)

Perry

16. According to Perry:

The subject invention is directed to improved energy management foams which not only exhibit excellent energy absorbing efficiency, but also exhibit excellent recovery. The subject invention energy management foams are prepared by reacting particular polymer polyols with an isocyanate component to generate rigid polyurethane foam, wherein the

total polymer solids content of the formulation exceeds  
15 weight percent.

(Perry 2:45-52.)

17. Perry instructs further:

[t]he polyol component of the subject polyurethane foams is at least bicompositional, having at least one high molecular weight portion and one low molecular weight portion. The polyol component must also contain sufficient dispersed polyacrylonitrile/styrene polymer polyol solids so as to result in minimally about 15 weight percent vinyl polymer solids in the foam, preferably 20% or more, more preferably 25% or more, with the range of 25% to 30% being especially useful.

(Perry 3:18-26.)

18. Perry provides cured foam comparative Examples C1 and C2 having 10.8 solids total percent (by weight). (Perry 8:45.)

### **C. Discussion**

On appeal, the burden is on Haider, as the Appellant, to establish reversible error in the rejections maintained by the Examiner. *See Gechter v. Davidson*, 116 F.3d 1454, 1460 (Fed. Cir. 1997) (“[W]e expect that the Board’s anticipation analysis be conducted on a limitation by limitation basis, with specific fact findings for each contested limitation and satisfactory explanations for such findings.”) (emphasis added); *In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (“On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness.”) (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

Haider states that, in each rejection, the claims stand or fall together. (Br. 3.) Accordingly, we shall restrict our attention to claim 13. 37 C.F.R. § 41.37(c)(1)(vii).

#### Claim Construction

During examination of an application for patent, “the PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997).

Claim 13 covers a polyurethane foam forming mixture that contains, at a minimum: (a)(i) a polymer polyol; (a)(ii) a polyol having a hydroxyl value ranging from about 200 to about 800; (b) a polymeric isocyanate or a prepolymer of a polymeric isocyanate; and (d) water. All other named ingredients are optional. Due to the presence of the transitional phrase “comprising,” the claimed mixture is open to other ingredients. *In re Baxter*, 656 F.2d 679, 686 (CCPA 1981). We observe that the term “polymer polyol” is a term of art that the 399 Specification defines as a dispersion of a polymer in a polyol (FF 2), typically made by polymerizing monomers such as acrylonitrile and styrene in a polyol. (FF 3.) We observe further that, as used in the 399 Specification, the term “hydroxyl value” has units of mg KOH/g [polymer]. (FF 6; Spec. 6:9-11.)

Claim 13 recites further that foams made from the mixture have certain properties, namely values of compressive strength, tensile adhesion,

and solids content within certain ranges. Although the 399 Specification states that “[t]he present invention is also directed to closed-cell water-blown rigid polyurethane foams . . .” (Spec. 10:10-11), claim 13 does not cover foams.

The 399 Specification describes, in illustrative but expressly non-limiting (Spec. 11:11-13) examples, formation of some specific foams by combining all the ingredients and mixing them with “a conventional motor-driven stirrer at 2800 rpm for ten seconds” (*id.* at 13:23-28.) It appears that the foam is generated during this stage. In the Examples, the reactive mixture is then poured into a mold, which is then closed and packed to a density of 15% over the minimum fill density, and then cured. (*Id.* at 13:28-14:5.) It is apparent from these examples that the properties of the foams recited in claim 13 depend on the manner and conditions of processing as well as on the composition of the foam-forming mixture. Claim 13 does not, however, recite any steps or conditions by which the foam-forming mixture must be processed to obtain the ultimate foams. Accordingly, we construe claim 13 as covering any foam-forming mixture that meets the recited compositional limitations and that can form—under any conditions—a foam having the recited properties.

#### Written Description

Whether or not the written description requirement of 35 U.S.C. § 112(1) is met is a question of fact decided by the preponderance of the evidence. The original specification must “describe an invention, and do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought.”

*Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). Put another way, “[a]lthough the exact terms need not be used *in haec verba*, the specification must contain an equivalent description of the claimed subject matter.” *Id.* (citation omitted). It is not enough that what is now claimed would have been an obvious variant of what is disclosed in the specification. *Id.* Each case turns on its own specific facts. *See e.g., In re Edwards*, 568 F.2d 1349, 1352 (CCPA 1978), and *id.* at 1354-55 (Miller, J., dissenting as to findings of fact and weighing of the evidence).

In the present case, the Examiner found that there was no description of the generic invention now claimed by Haider. We understand the Examiner to argue that the description of two particular examples having particular compositions, densities, compressive strengths, tensile adhesions, and particular weight percentages of solids in the foam, did not, without more, serve to identify a broad class of foams having the scope of the multitude of compositions covered by claim 13, distinguished from similar inventions by densities in the recited range of “about 5.4 to 12.1 w%, based on the weight of the foam.” (*See* the Final Rejection 2-3; Ans. 3.)

Haider argues in rebuttal that Table 2 presents four examples within the scope of the claimed invention, and “respectfully aver[s] therefore that Claims 13-19 reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, did indeed have possession of the claims range of 5.4 (Ex. 3) to 12.1 (Ex. 1).” (Br. 5-6.) Haider argues that it is unnecessary to spell out every detail of the invention, citing *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005). (Br. 6.)

Haider's reliance on *Lizardtech* is misplaced. The problem is that Haider is attempting to show that the 399 Specification describes, based on two specific examples, the broad class of compositions covered by claim 13, as amended (not to mention the narrower but still broad classes defined by the dependent claims). To some extent, this is the problem faced by every applicant who seeks, after an application has been filed, to claim a broad class that was not expressly defined in the specification and that was not defined by an original claim (and thereby provided with, in nearly all cases, an original description). As discussed in more detail *infra*, Haider has failed to show that the examples would have been understood to be fairly representative of the class of compounds covered by claim 13.

Resolution of this issue is aided by a determination of the meaning of the disputed limitation and its effect on the scope of the claimed subject matter. The solids content is recited to be "from about 5.4 to 12.1 wt.%, based on the weight of the foam." The term "about" signals a degree of approximation. *Modine Manufacturing Co. v. United States International Trade Commission*, 75 F.3d 1545, 1554 (Fed. Cir. 1996) ("Such broadening usages as "about" must be given reasonable scope; they must be viewed by the decisionmaker as they would be understood by persons experienced in the field of the invention.") (citations omitted). Here, the modifier "about" applies only to the lower limit. As can be seen by comparison with the compressive strength limitation ("from about 35 to about 105 lbs/in<sup>2</sup>"), Haider clearly knew how to specify a degree of variation or approximation at both ends of a range.

Haider's argument is not persuasive because it is purely conclusory. Haider presents no other evidence from the 399 Specification in support of

its conclusion. Nor has Haider come forward with other evidence, such as testimony from a person knowledgeable in the field, or an excerpt from an authoritative review indicating what one of ordinary skill in this art would have understood the original specification to teach generally. Thus, it is not clear from the specification itself that Example 1 provides a teaching of the class of foam forming mixtures capable of forming foams having a solids content of 12.1 wt%, nor that 12.1 wt% forms an upper limit of solids content. Similarly, it is not clear from the specification that Example 3 provides a teaching of the class of foam-forming compositions having a solids content of “about 5.4 wt.%,” nor that a class of compositions having a lower limit of about 5.4 wt% solids is defined.

As our function is primarily to review the Examiner’s rejections, guided by Appellant’s allegations of error and proposed findings of facts, we decline to exercise our discretion to make findings of fact regarding how this art would view the disclosures of the specification. Such findings would require subordinate findings as to ordinary practices in the art and the level of ordinary skill in the art. Although something of these matters might be gleaned from the art of record, weighing that evidence without input from Haider, which evidence is presently absent, would not, in our view, be appropriate at this stage of the proceedings. We therefore conclude that, on the present record, Haider has not proven reversible error in the Examiner’s finding that the subject matter of claim 13 is adequately described in the specification as filed.

The rejection of claims 13-19 under § 112(1) for lack of an adequate written description of the subject matter now claimed is AFFIRMED.

Hinz

The Examiner finds that Hinz describes foam-forming compositions that fall within the scope of claim 13. (Ans. 4.) More specifically, the Examiner identifies passages describing required elements (a)(i), the polymer polyol (Hinz 7:19-35); (a)(ii) polyol with hydroxyl value of about 200 to about 800 (*id.* at 2:15 and 24-31); (b), polymeric isocyanate (*id.* at 2:14); and (d), water (*id.* at 8:47-51).

Haider responds that the Examiner has failed to show that each and every element set forth in the claim is found in Hinz. (Br. 7.) More particularly, Haider appears to argue that Hinz fails as a reference because Hinz does not describe “rigid polyols”. (Br. 7-8.) This argument is without merit, as claim 13 does not recite any such limitations on the polyols. Moreover, the specification indicates that “[a]ny polyol known in the art which has a hydroxyl value within the range of from about 200 to about 800 can be used as component ii) in the polyol mixture of the present invention.” (Spec. 6:1-3; FF 5.) Patentability cannot be premised on limitations that are not express or inherent in a claim. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982), and limitations cannot be read from the specification into the claims *In re Hiniker*, 150 F.3d 1362, 1368 (Fed. Cir. 1998).

Haider also appears to rely on the Examiner’s alternative rejection of the claims under § 103 in view of Hinz and Perry, in which the Examiner “admitted” (to use Haider’s characterization) that Hinz does not particularly require a blend of a polymer polyol and a polyol having OH values as claimed. (Br. 8.) Haider concludes that Hinz fails to recognize the benefits

of a rigid polyol and a polymer polyol and that Hinz therefore fails to teach or suggest the claimed subject matter. (*Id.*)

This argument fails because Haider attempts to read limitations into the claim. As already determined, claim 13 does not require rigid polyols. Moreover, as the words of the statute indicate, anticipation under § 102(b) requires that a prior art reference describe the claimed subject matter: “A person shall be entitled to a patent unless—. . . the invention was . . . *described* in a printed publication . . .” 35 U.S.C. § 102(b) (emphasis added). Hinz describes reacting (a) polyisocyanates (Hinz 2:14) with “(b) at least one relatively high molecular-weight compound containing at least two reactive hydrogen atoms . . .” (*id.* at 2:15-17) of which polyether polyols having a hydroxyl number of from 384 to 410 mg KOH/g are favored (*id.* at 2:24-31). Hinz teaches that “*Particular* success has been achieved using, for example, polyether-polyamines and/or preferably polyols selected from the group consisting of polyether-polyols . . .” (*id.* at 5:36-39; emphasis added). Hinz further indicates that “[o]ther suitable polyether-polyols are polymer-modified polyether-polyols, preferably graft polyether-polyols, *in particular* those based on styrene and/or acrylonitrile and prepared by in-situ polymerization . . . , expediently in the abovementioned polyether polyols” as described in three of the same US patents cited by Haider. (*Id.* at 7:19-28; emphasis added.) Haider’s denial that Hinz describes mixtures that Hinz recommends with particularity is not persuasive.

Whether claimed subject matter is anticipated by a prior art reference is a question of fact. *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991). We find the weight the evidence advanced by the Examiner in favor of anticipation is greater and more persuasive than the evidence

advanced by Haider in opposition. We therefore AFFIRM the rejection of claims 13-19 under § 102(b) in view of Hinz.

It is well settled that "anticipation is the epitome of obviousness." *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) (quoting *In re Fracalossi*, 681 F.2d 792, 794 (CCPA 1982)). Therefore, we affirm the rejection of claims 13-19 under § 103(a) over the combined teachings of Hinz and Perry.

#### Perry

The Examiner finds that Perry teaches compositions for preparing water-blown rigid forms comprising blends of polymer polyol and a polyol having OH values, water, and polymeric isocyanates as recited in claim 13 (Ans. 7). The Examiner finds that Perry teaches water-blown polyurethane foams. (*Id.*) The difference in solid content values, according to the Examiner, does not adversely affect the obviousness rejection because the differences are small enough to lead to an expectation of similar properties. (Ans. 8, citing *Titanium Metals Corp. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985).)

Haider objects that Perry teaches [foams and mixtures for foams that have] vinyl polymer solids content of from 15 wt.% or greater, and thus fails to supply the missing teaching. (Br. 10.)

The Examiner and Haider at best support their arguments sparsely with citation to the record. Moreover, Haider does not challenge the Examiner's findings as to Perry. We note, however, that Perry teaches that the "polyol component must also contain sufficient dispersed polyacrylonitrile/styrene polymer polyol solids so as to result in minimally

about 15 weight percent vinyl polymer solids in the foam, preferably 20% or more, more preferably 25% or more, with the range of 25 to 30% being especially useful.” (Perry 3:20-25.) Moreover, Perry shows Comparative Examples C1 and C2 as producing foams having a solids content of 10.8 %. (*Id.* at 8:45.) From this, it is reasonably clear that “minimally about 15 weight percent” excludes 10.8 weight percent. We note further that 12.1 weight percent is closer to 10.8 weight percent than it is to 15 weight percent. The Examiner has not directed our attention to any credible evidence that, for Perry, “minimally about 15 weight percent” reads on 12.1 weight percent.

The Examiner’s argument for “discovering the optimal or workable ranges” fails for a similar reason. The Examiner has failed to identify any property that would be reasonably expected to be optimized by modifying Perry to make foams having solids contents as low as 12.1 weight percent. Similarly, the Examiner has not adequately established an evidentiary basis for the application of the reasoning of the court in *Titanium Metals*. That is, the Examiner has not directed our attention to credible evidence showing what properties would be expected to be sufficiently similar, at 12.1 wt%, to Perry’s compositions at about 15 wt%, such that the ordinary worker would regard the materials to be substantially the same.

In either case, Haider has demonstrated that the Examiner’s rejection is erroneous. Accordingly, we REVERSE the rejection under § 103 in view of Perry.

**E. Summary**

In view of the record and the foregoing considerations, it is:

ORDERED that the rejection of claims 13-19 under § 112(1) for lack of an adequate written description of the subject matter now claimed is AFFIRMED;

FURTHER ORDERED that the rejection of claims 13-19 under 35 U.S.C. § 102(b) in view of Hinz is AFFIRMED;

FURTHER ORDERED that the rejection of claims 13-19 under 35 U.S.C. § 103(a) in view of the combined teachings of Hinz and Perry is AFFIRMED;

FURTHER ORDERED that the rejection of claims 13 and 15-19 under 35 U.S.C. § 103(a) in view of Perry is REVERSED; and

FURTHER ORDERED that 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**

qsg

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