UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BRYAN D. KAUSHIVA and
WILLIAM E. SLACK

Appeal 2008-5464
Application 10/956,392
Technology Center 1700

Decided: January 7, 2009

Before BRADLEY R. GARRIS, LINDA M. GAUDETTE, and
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) (2002) from the Examiner's rejection of claims 1-20 and 39.[1] (Examiner's Answer entered Nov. 9, 2007, hereinafter "Ans."). We have jurisdiction pursuant to 35 U.S.C. § 6(b) (2002).

We AFFIRM.

THE INVENTION

Appellants' claimed invention is directed to flexible polyurethane foams comprising a reaction product of an isocyanate component and a polyol component, where the flexible polyurethane foam has flame retardant properties. The isocyanate component comprises about 0.5 wt. % to about 40 wt. %, based on the weight of the isocyanate component, of at least one methylenediphenylene diisocyanate (MDI) trimer allophanate, and at least one di- or poly-isocyanate. (Spec. 11, ll. 7-25).

Claims 1 and 10, reproduced below, are representative of the subject matter on appeal.

> 1. A flexible polyurethane foam comprising the reaction product of:
> an isocyanate component comprising
> about 0.5 wt. % to about 40 wt. %, based on the weight of the isocyanate component, of at least one methylenediphenylene diisocyanate (MDI) trimer allophanate, and
>
> at least one di- or polyisocyanate,
> with
> a polyol component, and
> optionally in the presence of one or more components chosen from catalysts, additives, surfactants, fillers, cross-linkers and blowing agents,

[1] Claims 21-38 and 40-57 have been canceled. (Appeal Brief filed Aug. 23, 2007, hereinafter "Br.," 2).

wherein the flexible polyurethane foam has fire retarding properties.

10. The flexible polyurethane foam according to Claim 1, wherein the polyol component comprises a blend of polyols having primary hydroxyl content of greater than about 65%.

THE REJECTION

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Scholl	US 5,124,370	Jun. 23, 1992
Slack	US 5,663,272	Sep. 2, 1997[2]
Kinkelaar	US 5,668,191	Sep. 16, 1997
Slack	US 6,127,308	Oct. 3, 2000[3]

The Examiner rejected claims 1-20 and 39 under 35 U.S.C. § 103(a) (2002) as being unpatentable over Kinkelaar in view of Slack ('308), Scholl, and Slack ('272). The Examiner found that Kinkelaar describes preparing flexible polyurethane foams including allophanate modified trimerized isocyanates as well as blends of isocyanates, but that Kinkelaar does not require the claimed allophanate modified trimer isocyanates having the particular claimed isocyanate contents. (Ans. 3). The Examiner found that Slack ('308) discloses allophanate-modified trimerized MDI, Scholl discloses trimerized stable MDI isomer mixtures, and Slack ('272) discloses liquid stable allophanate modified MDI isomer mixtures. (Ans. 3 and 4). The Examiner concluded that it would have been obvious to employ Slack ('308)'s allophanate-modified trimerized MDI isocyanates, prepared with

[2] Hereinafter "Slack ('272)."
[3] Hereinafter "Slack ('308)."

the mixtures of MDI isomers disclosed by Scholl and Slack ('272), as the modified isocyanates in Kinkelaar in order to impart acceptable isocyanate functionality and storage stability. (Ans. 4). The Examiner also found that Kinkelaar fails to teach the claimed primary hydroxyl content values, but that Kinkelaar does teach the control and benefits of the primary hydroxyl content values. (Ans. 5). The Examiner concluded that it would have been obvious to employ primary hydroxyl contents within the ranges of values disclosed in Kinkelaar to provide acceptable isocyanate reactive functionality in the practice of the invention. (Ans. 5).

Appellants contend that the Examiner has relied on hindsight reasoning and has not shown why one of ordinary skill in the art, having no knowledge of the claimed invention, would have selected the elements as claimed. (Br. 5). Appellants argue that the prior art does not teach or suggest the claimed allophanate-modified trimer. (Br. 6). Appellants contend that the prior art does not teach or suggest the claimed primary hydroxyl content. (Br. 6). Appellants contend that the fire retardant properties of the claimed combination of trimer and allophanate moieties would have been surprising, because Kinkelaar does not teach or suggest flame retardant properties of polyurethane foam. (Br. 6). Appellants argue the prior art does not teach or suggest that the recited combination of moieties would be preferred over any of the individual moieties. (Br. 6 and 7).

ISSUES

The issues presented on appeal are:

Have Appellants shown that the Examiner erred in determining that the claimed isocyanate component would have been obvious to one of ordinary skill in the art in view of the prior art of record?

Have Appellants shown that the Examiner erred in determining that the claimed primary hydroxyl content would have been obvious to one of ordinary skill in the art in view of Kinkelaar?

If Appellants have failed to show that the Examiner erred, have Appellants shown that the evidence in support of non-obviousness outweighs the Examiner's evidence in support of obviousness?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Kinkelaar describes a flexible polyurethane foam prepared from an isocyanate component and a polyol component, where the polyol component has a primary hydroxyl content of less than 50 mol percent. (Abstract; col. 1, ll. 9-17.)
2. Kinkelaar discloses that "[t]he isocyanate component may contain one or more di- or polyisocyanates or modified isocyanates." (Col. 6, ll. 16-17.)
3. Kinkelaar discloses that the modified isocyanates include allophanate-modified isocyanates and trimerized isocyanates. (Col. 6, ll. 27-36).

4. Kinkelaar discloses that MDI isocyanates are generally a mixture of 2, 2'-, 2, 4'- and 4, 4'- isomers, where the 4, 4'-isomer is present as the major component. (Col. 6, ll. 20-22).
5. Kinkelaar discloses that the isocyanate component may be a mixture of toluene diisocyanate (TDI) and MDI. (Col. 6, l. 40, Ex. 1-3).
6. Kinkelaar discloses that good quality flexible foams are produced from a combination of TDI and MDI and polyols having a high primary hydroxyl content of 88%. (Col. 7, ll. 25-62, Table 1, Ex. C1).
7. Slack ('308) describes the preparation of trimerized isocyanates having allophanate groups, where the isocyanate is MDI. (Col. 2, ll. 19-25; col. 3, l. 54- col. 4, l. 2).
8. Scholl teaches a mixture of MDI polyisocyanate trimers that are storage and liquid stable and may be used in the production of polyurethane foams. (Col. 1, ll. 8-15 and 53-61).
9. Slack ('272) describes producing liquid, stable, allophanate-modified MDI for foam and automobile applications. (Col. 3, ll. 9-20).
10. Appellants' Specification discloses that "[i]t is most preferred that the isocyanurate . . . makes up a significant fraction (above 0.5 wt. %) of the isocyanate of the foam formulation. (Spec. 12, ll. 18-20).
11. Appellants' Specification discloses that polyurethane foams containing isocyanurate (isocyanate trimer) linkages are thermally

stable and reduce the combustibility of foams made with isocyanurate linkages. (Spec. 3, ll. 5-20).

12. Appellants' Specification discloses two comparative examples of foams containing MDI trimer and no allophanate, and which also have self-extinguishing or flame-retarding properties. (Table III, C-2, C-8).

13. Appellants' Specification discloses a comparative example of a foam containing allophanate and no trimer, where the foam does not have fire retarding properties. (Table III, C-9).

PRINCIPLES OF LAW

In an obviousness rejection, the combination of references must be considered as a whole, rather than the specific teaching of each reference. *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971); *In re Simon*, 461 F.2d 1387, 1390 (CCPA 1972). Further, the Federal Circuit has held that when the difference between a claimed invention and the prior art is a claimed range; the applicant must show that the range is critical through unexpected results. *In re Woodruff,* 919 F.2d 1575, 1578 (Fed. Cir. 1990) (internal citations omitted).

Regarding the use of hindsight, the Supreme Court indicated that a fact finder "must be cautious of arguments reliant upon *ex post* reasoning," but went on to state that "[r]igid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742-43. (2007).

A showing of unexpected results may be sufficient to overcome a *prima facie* case of obviousness. *In re Dillon*, 919 F.2d 688, 692-93 (Fed. Cir. 1990) (internal citations omitted). Such a showing must be based on evidence, not argument or speculation. *In re Mayne*, 104 F.3d 1339, 1343-44 (Fed. Cir. 1997).

ANALYSIS

We confine our discussion to appealed claims 1 and 10, which contain the claim limitations representative of the arguments made by Appellants, pursuant to 37 C.F.R. § 41.37(c)(1)(vii) (2006).

Appellants have not presented any persuasive arguments to rebut the Examiner's conclusion that the claimed isocyanate component would have been obvious over the prior art as a whole. Kinkelaar discloses allophanate and trimerized MDI as well as mixtures of isocyanates. (FF 2-5). Slack ('308) discloses allophanate modified trimerized MDI. (FF 7). Scholl and Slack ('272) teach allophanate-modified MDI and MDI trimers that have improved stability. (FF 8 and 9). Appellants have not sufficiently demonstrated that the Examiner's rejection, which is based on the above combination of prior art and the benefits obtained therefrom, is in error. Further, Appellants have not shown that the claimed amount of MDI trimer allophanate is critical. (*See* FF 10).

Appellants also have not shown error in the Examiner's determination that the claimed hydroxyl content as recited in claim 10 would have been obvious to one of ordinary skill in the art. Appellants rely on Kinkelaar's disclosure that the polyol component preferably is a low primary hydroxyl containing component with up to 40 weight percent of high primary

hydroxyl component. (Br. 6). However, Appellants have failed to consider what the prior art as a whole conveys to one of ordinary skill in the art. Kinkelaar teaches that polyols having high primary hydroxyl content, 88%, produce foams having good foam quality. (FF 6). Therefore, one of ordinary skill in the art would have had a reasonable expectation of success in varying the primary hydroxyl content as determined by the Examiner. (Ans. 5).

Appellants also have not sufficiently demonstrated that the flame retardant properties of the claimed foams would have been unexpected. Appellants' Specification states that the presence of isocyanate trimer linkages (isocyanurates) is known to reduce the combustibility of foams. (FF 11). In addition, Appellants' Specification also discloses examples where foams produced from isocyanate trimer in the absence of allophanate has flame retardant properties, while an example of foam produced from allophanate without isocyanate trimer does not have flame retardant properties. (FF 12 and 13). Therefore, the flame retardant properties of the foam are a result of the presence of isocyanate trimer in the foam as is well known and expected in the art.

CONCLUSION

Appellants have failed to demonstrate that the Examiner erred in determining that the claimed isocyanate component would have been obvious to one of ordinary skill in the art in view of the prior art of record.

Appellants have failed to demonstrate that the Examiner erred in determining that the claimed primary hydroxyl content would have been obvious to one of ordinary skill in the art in view of Kinkelaar.

Appellants have not shown that the evidence in support of non-obviousness outweighs the Examiner's evidence in support of obviousness.

ORDER

We affirm the Examiner's decision rejecting claims 1-20 and 39 under 35 U.S.C. § 103(a) (2002) as being unpatentable over Kinkelaar in view of Slack ('308), Scholl, and Slack ('272).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(iv).

AFFIRMED

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