

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KRISTEN L. PARKS, FRANK SANNS, JR.,
RICHARD W. MITESSER, MERLE W. LESKO,
and RANDALL C. RAINS

Appeal No. 1997-2072
Application No. 08/261,544

ON BRIEF

Before METZ, PAK, and KRATZ, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1 through 9 which are all of the claims pending in the application.

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Claim 1 is representative of the subject matter on appeal
and reads as follows:

1. In a process for preparing a Class A surface, fiber
reinforced molded article comprising

(A) providing a mold, having a cavity therein for forming the
fiber reinforced molded article, wherein at least a portion of
the mold cavity defines a mold cavity surface against surface
the article is to be molded,

(B) laying one or more fiber surfacing veils against the mold
cavity surface,

(C) laying one or more layers of fiber reinforcing mat over
said surfacing veil,

(D) laying one or more fiber surfacing veils over said fiber
mat,

(E) closing the mold,

(F) injecting a reaction mixture via the RIM process into said
mold cavity,

(G) allowing the reaction mixture to fully react, and removing
the resultant molded product from the mold,

the improvement wherein said reaction mixture comprises

(1) one or more polymethylene poly(phenyl isocyanates) (i)
having a diisocyanate content of from 25 to less than 50% by
weight, (ii) containing less than 2% by weight of 2,4'-
methylene bis(phenyl isocyanate), and (iii) containing less
than 0.5% by weight of 2,2'-methylene bis(phenyl isocyanate),
and

(2) a blend of active hydrogen containing compounds
comprising:

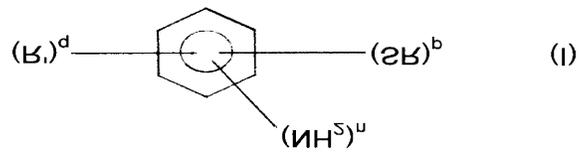
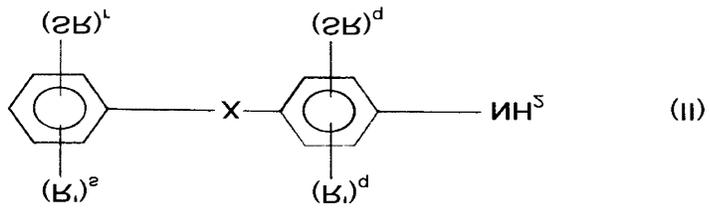
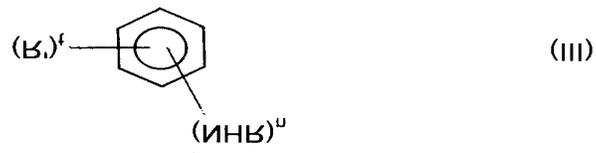
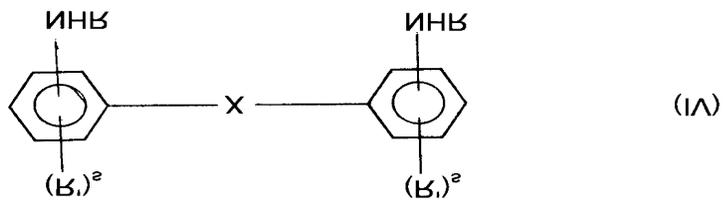
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(a) at least one polyether polyol having an hydroxyl functionality of from 2 to 8 and a molecular weight of from 350 to below 1800,

(b) at least one hydroxyl functional organic material containing from 2 to 8 hydroxyl groups and having a molecular weight below 350, components (a) and (b) being used in a weight ratio of from about 10:1 to about 1:10,

(c) no more than 45% by weight based on the total weight of components (a), (b), and (c), of one or more active hydrogen containing compounds having a molecular weight of 1800 or more, and

(d) from about 20% to about 40% by weight, based upon the total weight of components (a), (b), (c) and (d) of one or more hindered amines of the formula:



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where each R may be the same or different and represents an alkyl group,

each R' may be the same or different and represents
H or any substituent which does not adversely affect polyurethane formation,

n = 2 or 3,

p = 2 or 3,

q = 0 to 2,

r = 0 to 4,

s = 0 to 5,

t = 3 or 4, and

X is an alkylene or alkylidene,
with the amounts of components (1) and (2) being such that the isocyanate index is from about 70 to about 130.

The examiner relies on the following prior art:

Nodelman 1988	4,792,576	Dec. 20,
Kia 1990	4,957,684	Sep. 18,
Smith (Smith '634) 22, 1991	5,059,634	Oct.
Primeaux II et al. (Primeaux) 1992	5,124,426	Jun. 23,
Rains et al. (Rains) 1995	5,391,344	Feb. 21,
	(effective filing date Nov. 26, 1991)	
Smith (Smith '260) 1995	5,418,260	May 23,
	(effective filing date Oct. 4, 1993)	

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Claims 1 through 9 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Rains, Primeaux, Smith '260 and Smith '634. Claims 1 through 9 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Kia, Nodelman, Primeaux, Smith '260 and Smith '634.

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments and evidence advanced by both the examiner and appellants in support of their respective positions. This review leads us to conclude that the aforementioned § 103 rejections are not well founded. Accordingly, we reverse the aforementioned § 103 rejections since the examiner has not established a *prima facie* case of obviousness regarding the claimed subject matter. Our reasons for this determination follow.

The claimed subject matter is directed to a process for preparing a Class A surface, fiber reinforced molded article, such as an automotive part, "which exhibits little or no blistering when subjected to temperatures as high as 180°C." See Jepson claim 1 in conjunction with page 2 of the

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specification. The process involves conventional reaction injection molding steps, with the improvement being in the reaction mixture employed. See Jepson claim 1. The reaction mixture comprises specific polymethylene poly(phenyl isocyanates), polyether polyol, hydroxyl functional organic material, active hydrogen containing compound and hindered amines. *Id.* The amount of specific hindered amines employed is about 20% to about 40% by weight based on the total weight of the specific polyether polyol, hydroxyl functional organic material and active hydrogen containing compounds. *Id.* According to page 8 of the specification, "[t]he key to the present invention resides in using the hindered amine."

The dispositive question is therefore whether the applied prior art references as a whole would have suggested to one of ordinary skill in the art to employ the claimed reaction mixture in a conventional reaction injection molding (SRIM) process. We answer this question in the negative.

The closest prior art references, Rains and Nodelman, relied upon by the examiner as evidence of obviousness are directed to employing novel reaction mixtures in a conventional urethane structure reaction injection molding

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process. See, e.g., Rains, column 2, lines 8-68 and Nodelman, column 2, lines 3-24. According to both Rains (column 1, lines 13-48) and Nodelman (column 1, lines 7-32):

Reaction injection molding (RIM) has become an important process for the manufacture of a wide variety of moldings. The RIM process is a so-called "one-shot" process which involves the intimate mixing of a polyisocyanate component and an isocyanate-reactive component followed by the injection (generally under high pressure) of the mixture into a mold with subsequent rapid curing. The polyisocyanate component is generally a liquid isocyanate. The isocyanate-reactive component generally contains a high molecular weight isocyanate-reactive component (generally a polyol), and usually contains a chain extender or cross-linker containing amine or hydroxyl groups. U.S. Pat. No. 4,218,543 describes one particularly commercially significant RIM system, which requires the use of a specific type of aromatic amine as a cross-linker/chain extender. The preferred amine described in the '543 patent is diethyl toluene diamine (DETDA). Formulations based on DETDA are generally restricted to the lower flexural modulus range (i.e., less than about 70,000 psi at room temperatue [sic]). While it is known to use DETDA in combination with other co-chain extenders in order to increase the flexural modulus of the resultant molding, the use of such co-chain extender generally adversely affects the thermal properties of the resultant part.¹

¹Whether or not the disclosure of the '543 patent has a bearing on the patentability of the appealed subject matter has not been determined by this panel as the examiner has not relied on said reference to reject the appealed claims.

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Both Rains and Nodelman, therefore, do not employ diethyl toluene diamine or other co-chain extenders, including hindered amines, in their novel reaction mixtures. See both Rains and Nodelman in their entirety. Rather, they employ an organic polyisocyanate (inclusive of the claimed polyisocyanate) or the claimed polyisocyanate, together with the claimed polyether polyol, hydroxyl functional organic material and active hydrogen containing compound. See Rains, column 2, lines 43-65 and Nodelman, column 2, lines 5-24 and 40-68. These specific reaction mixtures produce molded articles having a flexural modulus of at least 750,000 psi and 600,000 psi, respectively. See Rains, column 1, lines 38-48 and Nodelman, column 2, lines 32-36 and columns 9 and 10, Table III. The molded articles can also "withstand heat over a broad range of temperatures up to 100°C" and have "a Class A surface." See, e.g., Rains, column 3, lines 2-6.

Given the fact that both Rains and Nodelman teach away from using diethyl toluene diamine and other conventional co-chain extenders, such as hindered amines, we agree with appellants that the applied prior art references as a whole

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would not have led one of ordinary skill in the art to employ the hindered amines described in Primeaux, Smith '634 and Smith '260 in the reaction mixtures of the type described in Rains or Nodelman to arrive at the claimed reaction mixture useful for a conventional structure reaction injection molding process. *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531-32 (Fed. Cir. 1988); *see also Ex parte Hartmann*, 186 USPQ 366, 367 (Bd. App. 1974) (the prior art references cannot properly be combined if effect would destroy the invention on which one of the prior art references is based).

This is particularly true in the present situation since Kia, Primeaux, Smith '634 and Smith '260 individually, or in combination, do not teach, nor would have suggested, that chain extenders, such as hinder amines, would not adversely affect the thermal properties of the resultant molded articles. Moreover, they do not teach or suggest that the hindered amines would be capable of improving the very high flexural modulus value provided by Rains' or Nodelman's reaction mixture. In this regard, we note that the prior art reaction mixtures containing hindered amines referred to by the examiner produce molded articles having significantly

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lower modulus values (6 to 7 times less) than those made by
Rains' or Nodelman's reaction mixture.

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In view of the foregoing, we reverse the examiner's
decision rejecting all of the appealed claims under 35 U.S.C.
§ 103.

REVERSED

Andrew H. Metz)	
Administrative Patent Judge)	
)	
)	
Chung K. Pak)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
Peter F. Kratz)	
Administrative Patent Judge)	

CKP:tdl

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