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Covestro LLC 1 Covestro Circle PITTSBURGH, PA 15205			RIOJA, MELISSA A	
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GUNDOLF JACOBS, HANS-DETLEF ARNTZ,  
HANS-GEORG PIRKL, and ANGELIKA SCHULZ

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Appeal 2019-002473  
Application 14/646,411  
Technology Center 1700

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Before CATHERINE Q. TIMM, CHRISTOPHER C. KENNEDY, and  
DEBRA L. DENNETT, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the  
Examiner’s decision to reject claims 14, 16–21, and 23–25. *See* Final Act.

1.<sup>2</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37  
C.F.R. § 1.42. Appellant identifies the real party in interest as Covestro  
Deutschland AG. Appeal Br. 1.

<sup>2</sup> The Final Action includes claim 15 as pending, but this claim was  
cancelled by Appellant in an amendment filed Sept. 1, 2017.

CLAIMED SUBJECT MATTER

The claims are directed to a process for producing flexible polyurethane (PUR) foams (*see, e.g.*, claim 14) and a flexible polyurethane (PUR) foam obtained by the process (*see, e.g.*, claim 24).

According to the Specification, the process involves “reacting organic polyisocyanates containing di- and polyisocyanates of the diphenylmethane (MDI) series with polyoxyalkylene polyethers.” Spec. 1:3–6. The polyoxyalkylene polyethers have an oxyethylene fraction of 10 to 20 wt%, based on the total weight of alkylene oxide fractions. Claim 14. The organic polyisocyanates have a ratio of 4,4'-MDI to 2,4'-MDI between 1.6 and 2.7. The process produces flexible PUR foams with an oxyethylene fraction of less than or equal to 20 wt. %, based on the total weight of all alkylene oxide fractions in all polyether polyols used to produce the foam.

Claim 14, reproduced below with the limitations most at issue highlighted, is illustrative of the claimed subject matter:

Claim 14. *A process for producing flexible PUR foams which have an oxyethylene fraction of less than or equal to 20 wt. %, based on the total weight of all alkylene oxide fractions in all polyether polyols used to produce the foam, having a DIN EN ISO 845 apparent density in the range of  $\geq 63 \text{ kg/m}^3$  to  $\leq 83 \text{ kg/m}^3$  and a DIN EN ISO 2439-1-2009 hysteresis of  $\leq 16$ , said process comprising reacting component A which comprises*

A1 one or more isocyanate-reactive components comprising:

A1.1 at least one polyether polyol having a functionality of 2 to 6, a DIN 53240 hydroxyl number (OH number) of 9 to 112 mg KOH/g, and *an oxyethylene fraction of 10 to 20 wt. %, based on the total weight of alkylene oxide fractions used,*

A2 water and/or physical blowing agents,

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A3 optionally, isocyanate-reactive hydrogen containing compounds having an OH number of 140 mg KOH/g to 1800 mg KOH/g,

A4 auxiliary and added-substance materials comprising

a) catalysts,

b) surface-active added-substance materials, and/or

c) pigments or flame retardants,

wherein component A is free of polyricinoleic esters,

with

component B an isocyanate component comprising

B1 a mixture of di- and polyisocyanates of the diphenylmethane (MDI) series,

and, optionally,

B2 one or more polyether polyols having a functionality of 2 to 8, a DIN 53240 OH number of  $\geq 9$  mg KOH/g to  $\leq 56$  mg KOH/g,

*wherein the ratio of 4,4'-MDI to 2,4'-MDI is between 1.6 and 2.7 and total monomer content is 75 to 85 wt. %, based on the total weight of isocyanates used,*

wherein the flexible PUR foam is produced at an isocyanate index of 75 to 110.

Appeal Br. 13–14 (Claims Appendix) (emphasis added).

## REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Herrington	US 5,010,117	Apr. 23, 1991
Elwell	US 5,114,989	May 19, 1992
Gansen	US 5,369,138	Nov. 29, 1994

## REJECTIONS

Claims 14, 16–19, and 23–25 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gansen, as evidenced by Herrington. Ans. 3.

Claim 20 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gansen. Ans. 9.

Claim 21 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Gansen in view of Elwell. Ans. 10.

## OPINION

### *Claim 14*

In arguing against the Examiner's rejection of claims 14, 16–19, and 23–25 as obvious over Gansen, as evidenced by Herrington, Appellant does not argue any claim apart from the others. We select claim 14 as representative for resolving the issue on appeal.

The issue on appeal is whether Appellant has identified a reversible error in the Examiner's finding that Gansen would have suggested to one of ordinary skill in the art forming a flexible polyurethane foam having an oxyethylene fraction within the range of claim 14 using an isocyanate mixture of 4,4'-MDI to 2,4'-MDI within the ratio further required by the claim.

Appellant has not identified such an error.

Gansen discloses a process of making molded cold-cure flexible polyurethane foams by reacting (a) aromatic polyisocyanates with (b) a combination of polyethers (b1) and (b2) and (d) water as a blowing agent. Gansen col. 2, ll. 15–43. Appellant does not dispute that as calculated by the Examiner, the total oxyethylene content can be as low as roughly 7.25 wt.%. *Compare* Final Act. 5–6, *with* Appeal Br. 5 (“Appellant submits that the overall range of oxyethylene content in the foam based on the broad disclosure in the Gansen reference is from 7.25 wt.% to 47.5 wt.%.”).

Appellant contends that “proper motivation does not exist for one to modify the oxyethylene content of the resultant foams of the Gansen reference in the manner necessary to arrive at the present invention.” Appeal Br. 6. According to Appellant, Gansen conveys that a high rebound resilience requires high ethylene oxide (EO) contents. Appeal Br. 5, citing Gansen col. 2, ll. 8–12. Appellant further contends that Gansen’s working examples would have led the ordinary artisan to conclude that the oxyethylene content must be greater than 20 wt.% to attain a high rebound resilience. Appeal Br. 5–6.

Gansen does not support Appellant’s contention.

First, Gansen’s column 2, lines 8–12 does not support Appellant’s argument because it discusses only one of two polyethers used in the reaction scheme, i.e., the polyether having an ethylene oxide content greater than 50 wt.%. Gansen col. 2, ll. 8–12 (“It has now surprisingly been found that when polyethers having an ethylene oxide content greater than 50 wt.% are used, even with MDI as the isocyanate, highly resilient foams can be prepared.”). This portion of Gansen is referring to polyether (b1) of the reaction components. Gansen col. 2, ll. 15–43. Gansen uses another

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polyether (b2), which has a lower ethylene oxide content of from 5 to 25 wt.% in combination with polyether (b1). *Id.* In column 2, lines 8–12, Gansen is merely expressing that, to get the desired resilience, from 5 to 30 wt.% of the polyether must be of the type containing an ethylene oxide content of at least about 50 wt.%. The other 70 to 95 wt.% of the polyether is the lower ethylene oxide content polyether. As pointed out by the Examiner, Gansen does not place limits on the overall ethylene oxide content of the polyurethane reaction product and the undisputed range of total ethylene oxide content is 7.25 wt.% to 47.5 wt.%, a range overlapping the less than or equal to 20 wt.% range of claim 14. Ans. 14–15.

The working examples do not persuade us that Gansen leads away from the lower overlapping portion of the range resulting from Gansen’s teachings. As further pointed out by the Examiner, a prior art reference is not limited to its examples. Ans. 15. *See In re Mills*, 470 F.2d 649, 651, CCPA 1972 (“[A] reference is not limited to the disclosure of specific working examples.”). We also agree with the Examiner’s analysis of the examples. Ans. 15–16. The comparative examples omit polyether (b1) and, the implication is that this omission causes the reduced resilience, not a higher range of the total content of ethylene oxide.

The Examiner relies on Herrington as evidence that the ordinary artisan would have had a reason to use the lower end of Gansen’s range of ethylene oxide content to decrease the foam product’s sensitivity to moisture. Final Act. 6. Herrington states that “increasing the ethylene oxide content of the polymer increases the foam’s sensitivity to moisture.” Herrington col. 1, ll. 53–55. Appellant’s argument that Herrington would not provide proper motivation is based on the argument regarding Gansen’s working examples that we found unpersuasive above. Appeal Br. 6. Thus,

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Appellant's argument against the Examiner's finding of a reason to use the lower end of the range of Gansen based on the teachings of Herrington is unpersuasive. Moreover, Gansen's overlapping range is sufficient of itself to support the Examiner's conclusion of obviousness without the use of Herrington.

As to the ratio of 4,4'-MDI to 2,4'-MDI, the Examiner finds that Gansen's Example 4, component B is a mixture having a ratio of 4,4'-MDI to 2,4'-MDI of about 2.4, a value within the range of 1.6 and 2.7. Final Act. 6. Appellant does not dispute that the 4,4'-MDI/2,4'-MDI mixture Gansen uses in Example 4 meets the requirements of claim 14. Instead, Appellant points out that other working examples use other isocyanate components with varying amounts of 4,4'-MDI to 2,4'-MDI and contends that "[a] logical basis for selecting this narrow range of 4,4'-MDI to 2,4'-MDI content simply does not exist. Nor is there a logical and/or reasonable basis for selecting this narrow range and combining it with an oxyethylene content of 20 wt. % or less in the foam." Appeal Br. 6; Reply Br. 8. Given Gansen expressly teaches using an isocyanate mixture with a 4,4'-MDI to 2,4'-MDI ratio within the range of the claim to form a suitable flexible polyurethane foam, we are unpersuaded of reversible error.

#### *Claim 20*

Appellant acknowledges that Gansen teaches or suggests in the broad disclosure using a prepolymer as required by claim 20. Appeal Br. 8. Appellant's arguments against the rejection of claim 20 parallel those already determined to be unpersuasive above. Appeal Br. 7-9. Further, we agree with the Examiner's response to those arguments. Ans. 17-18. Appellant has not identified a reversible error in the Examiner's rejection of claim 20.

*Claim 21*

Appellant repeats arguments against the Examiner’s findings regarding Gansen (Appeal Br. 9–11), which we already addressed above. For the reasons expressed above, those arguments are unpersuasive of reversible error by the Examiner.

CONCLUSION

The Examiner’s decision to reject claims 14, 16–21, and 23–25 is AFFIRMED.

DECISION SUMMARY

<b>Claim(s) Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
14, 16–19, 23–25	103(a)	Gansen, Herrington	14, 16–19, 23–25	
20	103(a)	Gansen	20	
21	103(a)	Gansen, Elwell	21	
<b>Overall Outcome</b>			14, 16–21, 23–25	

TIME PERIOD FOR RESPONSE

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

AFFIRMED