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SHELL OIL COMPANY
P O BOX 2463
HOUSTON, TX 77252-2463

EXAMINER	
KEYS, ROSALYND ANN	
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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 HENRICUS PETRUS DUIJGHUISEN
and MICHIEL BAREND ELEVELD

———————

Appeal 2011-010092
Application 11/628,688
Technology Center 1600

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Before TONI R. SCHEINER, FRANCISCO C. PRATS and JEFFREY N. FREDMAN, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal under 35 U.S.C. § 134 involves claims to a method of removing odor-causing impurities from crude polyether polyols. The Examiner entered two rejections for obviousness.

We have jurisdiction under 35 U.S.C. § 6(b). We affirm both rejections.

STATEMENT OF THE CASE

Polyether polyols are well known compounds used for many purposes, including "preparing polyurethanes by reacting them with polyisocyanates under appropriate conditions" (Spec. 1). Polyether polyols

can be prepared by reacting a hydroxyl group-containing initiator with an alkylene oxide like ethylene or propylene oxide in the presence of a double metal cyanide (DMC) complex catalyst (*id.*).

While polyether polyols prepared using DMC catalysts "are known to contain less by-products than similar polyether polyols made using strong basic catalysts . . . it was found that polyether polyols prepared with the help of DMC catalysts still have an unacceptable odour" (*id.* at 1-2). Appellants' invention is thus directed to the discovery that "odour-lean polyether polyols can be prepared in a simple and straightforward way from crude polyether polyols prepared with the help of DMC catalyst" by stripping the crude reaction product with an inert gas (*id.* at 2).

Claims 1-8 stand rejected and appealed (App. Br. 2). Claim 1, the only independent claim, is representative and reads as follows:

> 1. A process of preparing odour-lean polyether polyol from crude polyether polyol prepared with the help of a double metal cyanide complex catalyst which process comprises stripping crude polyether polyol in a vessel at a temperature of from 50 to 200°C, at a ratio of total amount of stripping gas introduced into the vessel to total amount of polyol introduced into the vessel of from 20 to 600 x 10^{-3} m^3 of inert gas per kg of polyol and at a residence time of the polyol of from 0.5 to 120 minutes.

The following rejections are before us for review:

(1) Claims 1-8, under 35 U.S.C. § 103(a) as obvious over Jochem Brons,[1] Gupta,[2] and Valbert[3] (Ans. 3-5); and

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[1] Jochem Brons et al., U.S. Patent App. Pub. No. 2003/0073873 A1 (published April 17, 2003).
[2] Gupta et al., U.S. Patent No. 5,672,768 (issued September 30, 1997).

(2) Claims 1-8, under 35 U.S.C. § 103(a) as obvious over Pazos[4] (Ans. 5-6).

As Appellants do not argue the patentability of any of the claims separately, the claims stand or fall together. *See* 37 C.F.R. § 41.37(c)(1)(vii).

OBVIOUSNESS –

JOCHEM BRONS, GUPTA, AND VALBERT

The Examiner found that Jochem Brons taught a process of preparing polyether polyols using a DMC catalyst substantially as recited in claim 1, including the claimed step of removing undesired byproducts from the polyols with an inert gas such as steam or nitrogen (Ans. 4). The Examiner noted that Jochem Brons cited Gupta and Valbert as describing suitable stripping techniques (*id.*).

The Examiner found that the amounts of stripping gas exemplified in Gupta and Valbert differed from the amount required by claim 1, but concluded, nonetheless, that an ordinary artisan would have considered it obvious to "modify the amount of stripping gas to obtain the desired polyol purity" (*id.*).

Specifically, the Examiner reasoned that "differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical" (*id.*). The Examiner further urged that "'[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine

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[3] Valbert, U.S. Patent No. 6,060,627 (issued May 9, 2000).
[4] Pazos, U.S. Patent No. 5,364,973 (issued November 15, 1994).

experimentation.'" (*Id.* at 4-5 (citing *In re Aller*, 220 F.2d 454 (CCPA 1955))).

> As stated in *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992):
>
> [T]he examiner bears the initial burden . . . of presenting a *prima facie* case of unpatentability. . . .
>
> After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.

Appellants' arguments do not persuade us that a preponderance of the evidence fails to support the Examiner's conclusion that an ordinary artisan would have considered claim 1 prima facie obvious in view of Jochem Brons, Gupta, and Valbert.

Appellants urge that, while Jochem Brons "generally discloses that polyols may be stripped by nitrogen or steam[,] [t]his reference does not teach or suggest the specific total amount of stripping gas or the residence time as claimed in the present application" (App. Br. 3).

Using the ideal gas law, and the conditions described in Valbert's example, Appellants calculate the volume of steam used in Valbert's example to be 2186.8 liters per kg of polyol (*id.*), a number the Examiner does not dispute. Using the ideal gas law, and the conditions described in Gupta's example, Appellants calculate the volume of steam used in Gupta's example to be 19,906 to 8,958 liters per kg of polyol (*id.*), which the Examiner also does not dispute.

Based on these teachings, Appellants argue that "[n]one of these references alone or in combination render the subject matter of claim 1 obvious" (*id.*).

As the Supreme Court has pointed out, however, "the mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness." *Dann v. Johnston*, 425 U.S. 219, 230 (1976).

Thus, while Appellants have, as noted above, pointed out the differences between claim 1 and the references cited by the Examiner, Appellants provide no clear or specific explanation as to *why* the cited references would have failed to suggest the claimed process to an ordinary artisan.

In contrast, the Examiner has advanced evidence, in the form of Jochem Brons, showing that stripping with an inert gas such as steam or nitrogen, as recited in Appellants' claim 1, was known to be a suitable technique of removing undesired byproducts from polyether polyols produced using a DMC catalyst (*see* Jochem Brons [0042]-[0043] (citing Gupta and Valbert)). The Examiner has also advanced evidence that the stripping processes disclosed by Jochem Brons as being suitable for byproduct removal include contacting the polyols with the stripping gas at temperatures of 110 to 150°C, for a time of 1 to 5 hours, which overlap claim 1's temperature range of 50 to 200°C, and residence time of 0.5 to 120 minutes (*see* Gupta, abstract).

Moreover, although not recited in Appellants' claim 1, the Examiner notes (Ans. 7), and Appellants do not dispute, that the actual amount of stripping gas disclosed by Gupta as being suitable, 5 to 30% by weight based on the quantity of polyether polyols (Gupta, col. 2, ll. 20-23), overlaps with the amounts described in Appellants' Specification as being preferred (*see* Spec. 6-7 ("Preferably the weight ratio of total amount of stripping gas introduced into the vessel to total amount of polyol introduced into the

vessel lies in the range from 1 to 5 parts by weight of gas per 100 parts by weight of polyol.")).

Thus, despite the differences in the volumes of stripping gas used in claim 1 as compared to Gupta and Valbert, given the similarities between the prior art processes and the claimed process, and the general teachings in the prior art that applying stripping gas removes undesired byproducts, we agree with the Examiner that, absent evidence to the contrary, an ordinary artisan would have reasoned that the volumes of gas recited in claim 1 would have been useful for removing undesired byproducts from the polyether polyols produced using a DMC catalyst. Moreover, Appellants point to no clear or specific evidence undercutting the Examiner's finding that an ordinary artisan, advised by Jochem Brons, Gupta, and Valbert of the desirability of stripping crude polyether polyol products with inert gases, would have considered it a matter of routine optimization to determine suitable volumes of gas to use.

As the Federal Circuit has explained, "[w]here 'the difference between the claimed invention and the prior art is some range or other variable within the claims . . ., the [applicants] must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results.'" *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322 (Fed. Cir. 2004) (quoting *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)); *see also Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 1349 (Fed. Cir. 1984) (claimed device that differed from the prior art with respect to dimensional limitations but performed and operated in the same manner as the prior art device held obvious).

In the instant case, Appellants' arguments direct us to no clear or specific evidence suggesting that the claimed volumes of gas produce a result that an ordinary artisan would have considered unexpected.

In sum, as Appellants' arguments do not persuade us that the Examiner failed to make out a prima facie case of obviousness as to claim 1, and as Appellants have not advanced evidence of unexpected results adequate to outweigh the Examiner's evidence of prima facie obviousness, we affirm the Examiner's rejection of claim 1 over Jochem Brons, Gupta, and Valbert. Claims 2-8 fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii).

OBVIOUSNESS – PAZOS

The Examiner cited Pazos as disclosing that, when preparing polyether polyols using a DMC catalyst, it was desirable "to remove volatile compounds via a distillation column or flasher and if desired an inert gas such as nitrogen, argon, or the like can be used" (Ans. 5 (citing Pazos, col. 3, l. 3, to col. 4, l. 27)). The Examiner found, and Appellants do not dispute, that Pazos described operating the flasher at a temperature range encompassed by the range recited in claim 1, and that Pazos' exemplified residence times were also encompassed by claim 1 (*id.*).

The Examiner found that, while Pazos did not disclose the ratio of stripping gas to polyol used, an ordinary artisan would nonetheless have considered it obvious "to select a suitable amount of stripping gas necessary to achieve the desired removal of volatiles. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical" (*id.* at 6 (citing *In re Aller*, 220 F.2d 454)).

Appellants argue:

> [Pazos] does not teach the use of an inert gas to ***strip*** a polyol to reduce an odour-lean polyol. The use of inert gases is in conjunction with using propylene oxide. In addition, there is no disclosure or teaching of the ***total*** amount of stripping gas as claimed in claim 1. There is no disclosure, teaching, suggestion or motivation in this reference that would lead one of ordinary skill in the art to the claimed invention.

(App. Br. 4.)

Appellants' arguments do not persuade us that the Examiner erred in concluding that an ordinary artisan would have considered claim 1 prima facie obvious in view of Pazos.

Pazos discloses that, when preparing polyether polyols using DMC catalysts (*see* Pazos, col. 3, ll. 48-50), "allyl alcohol and lower allyl alcohol propoxylates can be effectively removed from polyols before they grow to relatively nonvolatile, inseparable, polyether monol impurities, and that polyether polyols with exceptionally low unsaturations can be made" (*id.* at col. 4, ll. 2-7). As Pazos explains, and as the Examiner pointed out, "[i]f desired, an inert gas such as nitrogen, argon, or the like can be used to assist the flow of these components into the vapor phase" (*id.* at col. 4, ll. 25-27).

We note, as Appellants argue, that Pazos describes the removal of the impurities during the polymerization reaction (*see, e.g.*, *id.* at col. 1, ll. 11-14 ("The key to the process is the discovery that allyl alcohol and lower allyl alcohol propoxylates can be effectively and continuously removed from the reaction mixture *during epoxide polymerization.*" (Emphasis added.)).

Claim 1, however, simply requires "stripping crude polyether polyol" by introducing an inert gas and a polyether polyol into a vessel, and contains no language that excludes epoxide from the stripping vessel. Moreover,

Appellants point to nothing in Pazos suggesting that its reaction vessel would fail to contain polyether polyol.

Thus, the fact that Pazos performs its stripping process in its reaction vessel does not persuade us that Pazos fails to teach or suggest stripping crude polyether polyol with an inert gas as claimed. Indeed, contrary to Appellants' argument that Pazos does not describing stripping, Pazos expressly describes the removed undesired products as "the stripped, volatile components" (Pazos, col. 5, ll. 17-18),

As to the range of stripping gas volumes recited in claim 1, Appellants direct us to no clear or specific evidence undercutting the Examiner's finding that an ordinary artisan, advised by Pazos of the desirability of stripping crude polyether polyol products with inert gases, would have considered it a matter of routine optimization to determine suitable volumes of gas to use. Appellants' arguments therefore do not persuade us that the Examiner failed to make out a prima facie case of obviousness as to claim 1.

Appellants' arguments also do not direct us to any clear or specific evidence suggesting that the claimed volumes of gas produce a result that an ordinary artisan would have considered unexpected. Thus, as Appellants' arguments do not persuade us that the Examiner failed to make out a prima facie case of obviousness as to claim 1, and as Appellants have not advanced evidence of unexpected results adequate to outweigh the Examiner's evidence of prima facie obviousness, we affirm the Examiner's rejection of claim 1 over Pazos.

Claims 2-8 fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii).

SUMMARY

We affirm the Examiner's obviousness rejection of claims 1-8 over Jochem Brons, Gupta, and Valbert.

We also affirm the Examiner's obviousness rejection of claims 1-8 over Pazos.

TIME PERIOD

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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