

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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MAILED

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PAT.&T.M. OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

*Ex parte* AJAY K. GARG  
and  
EDWARD LILLEY

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Appeal No. 94-1112  
Application 07/705,999<sup>1</sup>

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ON BRIEF

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Before KIMLIN, WEIFFENBACH and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

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<sup>1</sup> Application for patent filed May 28, 1991.

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**DECISION ON APPEAL**

This is an appeal from the final rejection of claims 1 through 6, 8 through 10 and 13. Remaining claims 7, 12, 14, 15 and 17 have been allowed and claim 16 has been withdrawn from consideration under 37 CFR § 1.142(b) as being drawn to a non-elected invention. Claim 1 is illustrative of the invention encompassed by the claims on appeal:

1. A process comprising at least partially converting boehmite to alpha alumina by subjecting the boehmite to a mechanochemical treatment in the substantial absence of water at a temperature below about 100°C.

The claims on appeal are represented by claim 1 on appeal<sup>2</sup> which is drawn to processes comprising at least partially converting boehmite to alpha alumina through mechanochemical treatment in the substantial absence of water at a temperature of below about 100°C. This step is part of a larger process in which boehmite is variously treated, culminating in alpha alumina through reduced thermal conversion temperatures.<sup>3</sup> These processes may include steps involving the prior treatment

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<sup>2</sup> We will not discuss the particulars of the remaining claims on appeal as appellants have stated that the claims on appeal stand or fall together with respect to the grounds of rejection under 35 U.S.C. § 103 (brief, pages 8 to 9). See *Ex parte Schier*, 21 USPQ2d 1016 (Bd. Pat. App. & Int. 1991); 37 CFR 1.192(c)(5)(1993).

<sup>3</sup> See, e.g., specification, page 3, line 22, to page 4, line 12.

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of the boehmite, such as heating, seeding and sol-gel formation, as well as the final conversion step to alpha alumina, all of which is encompassed by claim 1 on appeal through the use of the open-ended term "comprising."<sup>4</sup>

The references relied on by the Examiner are:

Cottringer et al. (Cottringer)      4,623,364      Nov. 18, 1986

Panis, "Mineralogy - Effects of Prolonged Grinding at Room Temperature on the Boehmites," *Comptes Rendus Acad. Sc. Paris*, t.271, Series D, pp. 153-55 (July 1970)

Tsuchida, *Chemical Abstracts*, Vol. 111, No. 244740t (1989)

The Examiner has rejected claims 1 through 6 on appeal under 35 U.S.C. § 112, second paragraph; claims 1, 4 and 5 on appeal under 35 U.S.C. § 103 as being unpatentable over Tsuchida or Panis; and claims 1 through 6, 8 through 10 and 13 on appeal under 35 U.S.C. § 103 as being unpatentable over Cottringer in view of either Panis or Tsuchida. Upon careful review of the record presented on appeal, we will sustain both of the grounds of rejection under 35 U.S.C. § 103 but not the ground of rejection under 35 U.S.C. § 112, second paragraph.

Rather than reiterate the respective positions advanced by the examiner and the appellants with respect to the ground of

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<sup>4</sup> See, e.g., specification Examples.

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rejection, we refer to the answer and to the brief<sup>5</sup> for a complete exposition thereof.

*Opinion*

*35 U.S.C. § 112, second paragraph*

The examiner has rejected claims 1 through 6 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention because "(i)t is unclear as to what is the scope of a 'mechanochemical treatment'" (answer, page 8).

We have reviewed the language of the claims as a whole as well as in view of the specification as to whether the claims in fact set out and circumscribe a particular area with a reasonable degree of precision and particularity as required by the statute. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971). The operative standard for determining whether this requirement is met is "whether those skilled in the art would understand what is claimed when the claim is read in light of the specification."

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<sup>5</sup> The record in this appeal includes the brief filed July 1, 1993 (Paper No. 18) which is stated to be a "further representation" of the brief filed on April 16, 1993 (brief, page 1). See the Examiner Interview Summary Record for the interview held June 30, 1993 (Paper No. 17).

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*The Beachcombers, Int'l. v. WildeWood Creative Products*, 31 F.3d 1154, 1158, 31 USPQ2d 1653, 1656 (Fed. Cir. 1994), *Orthokinetics Inc. v. Safety Travel Chairs Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). We find that the specification provides ample disclosure of mechanochemical treatments such that one skilled in the art would reasonably understand what is claimed in light thereof.<sup>6</sup>

Accordingly, the examiner's rejection of claims 1 through 6 under 35 U.S.C. § 112, second paragraph, is reversed.

**35 U.S.C. § 103**

We agree with the examiner that the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the claimed invention was made over Tsuchida or Panis as to claims 1, 4 and 5 on appeal and over Cottringer in view of either Panis or Tsuchida as to claims 1 through 6, 8 through 10 and 13 on appeal. There is no dispute as to the evidence contained in Panis or Tsuchida.<sup>7</sup> Tsuchida teaches that prolonged milling of boehmite in air for 4 or 8

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<sup>6</sup> See, e.g., page 3, lines 16 to 20; page 17, lines 10 to 24.

<sup>7</sup> See, specification, page 3, lines 1 to 12; brief, page 7, last paragraph, and page 10, line 17, to page 11, line 1; and answer, page 4, line 19, to page 5, line 5.

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hours produces an amorphous phase which has a different transformation sequence to alpha alumina and a lower temperature of alpha-transformation by  $>200^{\circ}\text{C}$  than unground hydrated aluminas. Panis provides a similar disclosure in that prolonged milling of boehmite at room temperature for a few hours to 15 hours produced a product which is described as quasi-amorphous with a decreased recrystallization temperature. There is also no dispute as to the evidence provided by Cottringer.<sup>8</sup> This reference teaches that the milling of a sol of boehmite with alumina grinding media, which provides alpha alumina "seeds," for .02 to 2 hours will result in a lower alpha alumina conversion temperature than if the milling was accomplished in the absence of such "seed" material.

We agree with the examiner that both Tsuchida and Panis would have reasonably suggested to one of ordinary skill in the art that mechanochemical treatment of boehmite under the conditions shown in these references would have resulted in the beneficial lowering of the temperature required for conversion of

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<sup>8</sup> See, specification, page 1, line 29, to page 2, line 7, page 5, lines 4 to 8; brief, page 5, lines 16 to 17, page 8, lines 9 to 12, page 9, lines 8 to 13, and page 12, lines 18 to 22; and answer, page 3, line 13, to page 4, line 10, page 5, lines 23 to 24, page 6, lines 7 to 11.

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the boehmite to alpha alumina in subsequent treatment steps encompassed by the claim through the use of the open-ended term "comprising." We further agree with the examiner that Tsuchida and Panis would have reasonably suggested to one of ordinary skill in this art that the milling step in the processes of Cottringer may be performed under their conditions with a reasonable expectation that such a modification of the Cottringer processes would have successfully reduced the conversion temperature of the boehmite alpha alumina precursor. Indeed, as pointed out by the examiner, Cottringer reasonably evinces that one of ordinary skill in this art would have recognized the benefits of reducing the alpha alumina conversion temperature<sup>9</sup> and it is apparent that the processes of Tsuchida and Panis would further that purpose.

We reach our conclusion as to both grounds of rejection even though we recognize that while claim 1 on appeal requires the same mechanochemical treatment of boehmite under the conditions of substantial absence of water and a temperature below about 100°C as found in either Tsuchida or Panis, it further requires "at least partially converting boehmite to alpha

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<sup>9</sup> See, e.g., Cottringer, col. 2, line 66, to col. 3, line 5, and col. 6, lines 39 to 55.

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alumina" during this mechanochemical treatment as to which unrecovered intermediate product both references are silent. As to this matter, we share the examiner's view that "(i)nherently, the alpha alumina content of the mixture would increase to the same extent in the process of the combined references as in the instant claims because the positive process step would be the same" (answer, page 5). Indeed, the same process step would appear to be involved in claim 1 on appeal as in Tsuchida and Panis since "at least partially converting boehmite to alpha alumina" via the mechanochemical treatments requires a time period of from 30 minutes to 72 hours as set forth in the specification Examples, which range is inclusive of the ranges for milling time disclosed in each of Tsuchida and Panis. *Cf. In re Woodruff*, 919 F.2d 1575, 1577, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). Thus, on the record before us, we consider the claimed process steps to be the same as those of the processes of Tsuchida and Panis, resulting in the same unrecovered intermediate product, and we find no evidence of record that there is a difference in the ultimate alpha alumina product of the claimed processes and those of Tsuchida and Panis. *See In re King*, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986); *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); *In re Skoner*,

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517 F.2d 947, 186 USPQ 80 (CCPA 1975); *cf. In re Sussman*,  
141 F.2d 267, 60 USPQ 538 (CCPA 1944).

Accordingly, we are of the view that the examiner has established a *prima facie* case of obviousness over the prior art as applied, in view of which the burden of going forward has shifted to appellants to submit argument or evidence in rebuttal. We have given due consideration to the weight of appellants' arguments submitted in their brief in again assessing the patentability of the claimed invention as a whole based on the record as a whole. See generally *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472-73, 223 USPQ 785, 788 (Fed. Cir. 1984); *In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984); and *In re Rinehart*, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We are not persuaded by appellants' allegation that as to the claimed processes vis-à-vis those of Tsuchida and Panis "(t)he milling operations are clearly not equivalent as those of the references did not produce alpha alumina whereas the process of the Appellants did" (brief, page 11), as there is no evidence of record supporting appellants' contention that the processes of Tsuchida and Panis did not succeed in "at least

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partially converting boehmite to alpha alumina" as required by claim 1 on appeal. *In re Payne*, 606 F.2d 303, 315, 203 USPQ 245, 256 (CCPA 1979); *In re Greenfield*, 571 F.2d 1185, 1188-89, 197 USPQ 227, 229-30 (CCPA 1978). As we concluded above, the evidence of record establishes that the same process step is involved and would result in the same unrecovered intermediate product. Thus, under these facts, appellants' burden of proof can only be satisfied by evidence that a different product is produced via additional process steps. *King*, supra; *Best*, supra; *Skoner*, supra; *Sussman*, supra.

We are also not persuaded by appellants' arguments that there is no motivation for one of ordinary skill in this art to modify the processes of Cottringer by adopting the mechanochemical milling conditions taught by Tsuchida and Panis (brief, pages 13 to 15). Appellants suggest that the result achieved by Cottringer alone is essentially equivalent to that which would be achieved if the mechanochemical milling conditions used by Cottringer were modified by the teachings of Tsuchida and Panis. However, as pointed out by the examiner, better results would be reasonably expected from the use of the mechanochemical milling conditions of Tsuchida and Panis. Even if the results may be said to be essentially equivalent, the use of the mechanochemical

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milling conditions of Tsuchida and Panis in the processes of Cottringer would still have been a modification well within the ordinary skill in the art. See *Ex parte Novak*, 16 USPQ2d 2041 (Bd. Pat. App. & Int. 1989), *aff'd mem.*, 16 USPQ2d 2043 (Fed. Cir. 1990). We find no merit in appellants' arguments with respect to the matter of crystal growth, as there is no limitation in claim 1 on appeal which relates to this condition.

Accordingly, in again assessing patentability based on the record before us as a whole, we find that the relative strength of the arguments as to nonobviousness presented by appellants as a whole, as considered above, fail to overcome the relative strength of the evidence of obviousness established over the applied references by the examiner. Thus, we conclude that the claimed invention as a whole would have been obvious under 35 U.S.C. § 103 as a matter of law as to either ground of rejection.

In summary, we have reversed the examiner's decision as to the rejection of claims 1 through 6 on appeal under 35 U.S.C. § 112, second paragraph, but have affirmed the examiner's decision as to the rejection of claims 1, 4 and 5 on appeal under 35 U.S.C. § 103 as being unpatentable over Tsuchida or Panis, and the rejection of claims 1 through 6, 8 through 10 and 13

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on appeal under 35 U.S.C. § 103 as being unpatentable over  
Cottringer in view of either Panis or Tsuchida.

The decision of the examiner is affirmed.

No time period for taking any subsequent action in con-  
nection with this appeal may be extended under 37 CFR § 1.136(a).

*Affirmed*

  
EDWARD C. KIMLIN )  
Administrative Patent Judge )

  
CAMERON WEIFFENBACH )  
Administrative Patent Judge )

  
CHARLES F. WARREN )  
Administrative Patent Judge )

BOARD OF PATENT  
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