

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* RAINER HOCHSMANN

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Appeal 2009-014444  
Application 10/559,920  
Technology Center 1700

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Before ADRIENE LEPIANE HANLON, CHARLES F. WARREN, and  
PETER F. KRATZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicant appeals to the Board from the decision of the Primary Examiner finally rejecting claims 20-37 in the Office Action mailed September 19, 2007. In the Brief, Appellant states that “[c]laims 20-34 are . . . not under appeal.” Br. 6. The Examiner canceled claims 20-34 in the Communication mailed December 17, 2008. Thus, claims 35-37 remain for consideration on appeal. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R. § 41.31(a) (2008).

We affirm the decision of the Primary Examiner.

Claim 35 illustrates Appellant's invention of a procedure for layered composition of a metal casting mould, and is representative of the claims on appeal:

35. A procedure for layered composition of a metal casting mould, comprising the steps of:

a) mixing solid particles of a bonding agent comprising a salt-crystal or a salt-crystal and protein combination, with a sand that comprise quartz sand, zircon sand, olivine sand, fireclay sand or a combination thereof, to form a bonding agent/sand admixture;

b) applying a thin layer of the bonding agent/sand admixture to an assembly field of an assembly platform;

c) selectively applying an aqueous solvent via a droplet generator, in a sufficient dose. [sic]

d) dissolving with the aqueous solvent the salt-crystal or salt-crystal and protein combination, so that the salt-crystal or salt-crystal and protein combination substantially encompasses the sand particles within a layer and to underlying sand particles that may be present;

e) drying the aqueous solvent so that the bonding agent/sand admixture bind together;

f) lowering the assembly platform;

g) repeating at least steps (a)-(e) for applying an additional layer until the metal casting mould is complete;

h) casting a metal casting from the resulting metal casting mould;

i) coring the metal casting through the [sic] immersion in a water bath;

j) dissolving the bonding agent/sand admixture in the water bath; and

k) recycling the sand from the water bath.

Appellant requests review of the ground of rejection under 35 U.S.C. § 103(a) advanced on appeal by the Examiner: claims 35-37 over Melling (US 5,573,055) in view of Sachs (US 6036,777). Br. 10;<sup>1</sup> Ans. 3.

Appellant argues the claims in the ground of rejection as a group. *See generally* Br. Thus, we decide this appeal based on claim 35. 37 C.F.R. § 41.37(c)(vii) (2008).

### Opinion

We are of the opinion Appellant's arguments do not establish that the evidence in the totality of the record weighs in favor of the nonobviousness of the claimed procedure for layered composition of a metal casting mould encompassed by claim 35. In this respect, we are in agreement with the Examiner's analysis of the evidence in the references and the legal conclusions stated in the Answer, to which we add the following for emphasis with respect to Appellant's arguments.

The principal issue in this appeal is whether Appellant has established that the Examiner erred in finding that Melling would have disclosed a salt-crystal as a bonding agent. Appellant submits that Melling teaches a "glassy binder material" bonding agent, and that "salt-crystals" do not work as a bonding agent as shown by Melling Comparative Example 1, thus teaching away from the claimed procedure encompassed by claim 35. Br., e.g., 11, 12-13, 16, 17, and 18, citing Melling col. 18, ll. 6-22.

We agree with the Examiner's finding that Melling would have disclosed "a binder including polyphosphate" which "may be derived from

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<sup>1</sup> We considered the Appeal Brief filed July 29, 2009, and the Examiner's Answer mailed December 12, 2008.

water soluble ‘salt-crystal’ (phosphate glass).” Ans. 3-4, citing Melling col. 2, ll. 56 et. seq.; *see also* Ans. 5-6, citing Melling col. 3, ll. 34-48, and col. 5, ll. 14-42. The Examiner submits that Melling’s “‘glassy’ material is “‘water dispersible’ (i.e. dissolvable, which is a property of a salt and NOT most glasses, which have little or no solubility . . . .)” Ans. 5-6. The Examiner thus finds that Melling’s “glassy” material “would be inclusive of the appellant’s claimed ‘salt-crystal.’” Ans. 6.

We find that Melling would have disclosed to one of ordinary skill in the art that a binder to mix with sand to form a metal casting mould can include, among other things, “polyphosphate chains” which can be “derived from at least one water soluble phosphate” that “may be wholly or partially dissolved into the water.” Melling col. 2, ll. 53-65. In this respect, Melling discloses that a water soluble phosphate glass binder that provides polyphosphate chains when dissolved in water includes “binary  $\text{Na}_2\text{O}/\text{P}_2\text{O}_5$  glass,” which are “commonly available phosphate glasses.” Melling col. 3, ll. 34-60, and col. 5, ll. 14-49. We further find that in Melling’s process, water can be applied to the mixture of binder and sand particles in the form of a fine water spray after the mixture is blown into a mould box during the forming step. Melling col. 4, ll. 14-42.

We find that one of ordinary skill in the art would have known that “sodium polyphosphate” has the formula “ $\text{Na}_{n+2}\text{P}_n\text{O}_{3n+1}$ ” and includes “sodium polyphosphates for which the mole ratio of  $\text{Na}_2\text{O}/\text{P}_2\text{O}_5$  is between 1 and 2;” and that “phosphate glass” is “[a] type of glass containing phosphorous pentoxide.” *See, e.g., Hawley’s Condensed Chemical*

*Dictionary* 1023 and 869 (14th ed., Richard J. Lewis, Sr., revisor, John Wiley & Sons, Inc., 2001).

We find that Appellant discloses that the “bonding agent” can be, among other things, “sodium polyphosphate.” Spec. 7:5-7.

We find that Melling Comparative Example 1 illustrates that “crystalline sodium phosphate with an equivalent weight % composition as the phosphate glass having the composition  $P_2O_5$  70.2 wt %,  $Na_2O$  29.8 wt %,” wherein the crystalline sodium phosphate did not work while “[a]n equivalent treatment in the case of the equivalent phosphate glass would have resulted in a core with good handling characteristics.” Melling col. 18, ll. 6-22.

On this record, we cannot agree with Appellant’s position. As the Examiner points out, one of ordinary skill in this art would have recognized from Melling that the “phosphate glass,” used as the binder is water soluble and provides polyphosphate chains when dissolved in water, can be “sodium polyphosphate.” The Examiner’s position that Melling’s water-soluble “phosphate glass” is encompassed by the claimed “salt-crystal” encompassed by claim 35 is established by the disclosure in Appellant’s Specification that the term “salt-crystal” encompasses “sodium polyphosphate.” Thus, Melling’s Comparative Example 1 which illustrates “sodium phosphate” does not “teach away” from the claimed sodium polyphosphate salt-crystal as Appellant contends.

We note here that while we agree with Appellant that Melling does not disclose a binder which is “a salt-crystal and protein combination” as claimed in claim 35, this claim thus reads on both obvious and nonobvious

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subject matter and therefore, claim 35 is too broad in the sense of § 103(a). Br. 12 and 19. *See, e.g., In re Muchmore*, 433 F.2d 824, 826 (CCPA 1970).

Finally, Appellant's contention that the Examiner erred because the Examiner did not articulate a reason for the legal conclusion of obviousness over the combined teachings of Melling and Sachs is not supported by argument addressing the Examiner's position. Ans. 4 and 7-8; Br. 12, 15-16, and 18-19.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Melling and Sachs with Appellant's countervailing evidence of and argument for nonobviousness and conclude, by a preponderance of the evidence and weight of argument, that the claimed invention encompassed by appealed claims 35-37 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The Primary Examiner's decision is affirmed.

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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