

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 RALF ANSELMANN, CARSTEN GRIESSMANN,
MANUELA LOCH, AND KURT MARQUARD

Appeal No. 1998-1353
Application No. 08/488,288

ON BRIEF

Before JOHN D. SMITH, KRATZ, and TIMM, *Administrative Patent Judges*.
TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-9. Claims 1 and 6 were amended, claims 2-4 canceled, and claim 10 added by the amendment after-final mailed November 27, 1996 (Paper No. 8). This amendment was entered as per the Advisory Action mailed on January 29, 1997 (Paper No. 9). Therefore, claims 1 and 5-10, which are all of the claims presently pending in this application, are on appeal.

BACKGROUND

Appellants' invention relates to a composition in the form of a free-flowing powder of agglomerates and a method of forming the agglomerates without flocculation. The agglomerates are prepared from a mixture of a binder, solvent and oxide particles comprising SiO₂, TiO₂, ZrO₂, Al₂O₃ or a mixture thereof obtained by hydrolytic polycondensation of alkoxides and having a surface modified by covalently bonded organic groups. The oxide particles are monodisperse, i.e. the particles have a narrow size distribution. According to the specification at page 3, "[t]he term monodisperse is to be understood as meaning that the particles of a certain diameter have the lowest possible particle size scatter lying within a very narrow range." A standard deviation of particle diameter of less than 10% and in particular less than 5% is preferred. The monodisperse oxide particles have a diameter between 10 nm and 10 μm. The binder, solvent and oxide particles are mixed together to form a suspension or dispersion and then the solvent is removed by distillation. The resulting agglomerates contain between 70-95% by weight of oxide particles and 5-30% by weight binder. The agglomerates have a diameter of 1-500 μm. Claims 1 and 6 are illustrative:

1. Preparations of monodisperse spherical oxide particles having a particle diameter between 10 nm and 10 μm and an essentially non-volatile binder in the form of a free-flowing powder of agglomerates having a diameter of between 1 μm and 500 μm, in which the particles are bonded to one another by the binder and in which 70 to 95% by weight of oxide particles and 30 to 5% by weight of binder are present, obtainable by mixing the oxide particles homogeneously with the binder in a corresponding ratio together with a solvent which is volatile being present in a weight ratio of 1:1 to 1:100, and then removing the solvent from the resulting suspension or dispersion by distillation, wherein the monodisperse spherical oxide particles comprise SiO₂, TiO₂, ZrO₂, Al₂O₃ or a mixture thereof, are

obtained by hydrolytic polycondensation of alkoxides and have a surface modified by covalently bonded organic groups.

6. Process for the preparation of preparations according to Claim 1, characterized in that 70 to 95% by weight of monodisperse spherical oxide particles with a particle diameter between 10 nm and 10 μm are mixed homogeneously with 30 to 5% by weight of an essentially non-volatile binder together with a solvent being present in a weight ratio of 1:1 to 1:100, and the solvent is then removed from the resulting suspension or dispersion by distillation, a free-flowing powder of agglomerates with a diameter between 1 μm and 500 μm being obtained without flocculation.

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Barker et al. (Barker)	4,701,218	Oct. 20, 1987
Kaliski	5,346,546	Sep. 13, 1994

Jon E. Browning, *Agglomeration: Growing Larger in Applications and Technology*, Chemical Engineering, Dec. 4, 1967, at 147¹.

8 *Chemical Engineer's Handbook* 57-65 (Robert H. Perry & Cecil H. Chilton eds., 5th ed. 1973).

The grounds of rejection on appeal are as follows:

1. Claims 1 and 5-10 stand rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over Kaliski.
2. Claims 1, 5-7 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Barker².

¹We have enclosed a more complete and more readable version of this article.

²The rejection under 35 U.S.C. § 102(b) as being anticipated by Barker has been withdrawn (Answer, page 2).

3. Claims 1 and 5-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Perry or Browning.

OPINION

We reverse all of the rejections for the following reasons.

The Rejection over Kaliski

Kaliski describes forming aggregate-TiO₂ pigment products containing at least 50, preferably more than 77, parts by weight particulate TiO₂ and 0.1 to 23 parts by weight cements/adhesives, i.e. binder (col. 12, lines 37-43). The TiO₂ particulate is “derived from prior art TiO₂ pigment products in the state 'as is,' or comminuted further, beyond the limits of comminution practiced in the prior art.” (col. 11, lines 16-24). While Kaliski indicates that TiO₂ raw materials suitable for synthesizing the aggregates include the ultrafine type, which are “almost monodisperse” or “highly disperse³”, Kaliski does not describe a free flowing powder of agglomerates containing monodisperse TiO₂ having a surface modified by covalently bonded organic groups as required by claim 1. The Examiner states in the rejection (Substitute Examiner’s Answer, pages 5-6) that “[t]he addition of organophilic components to modify the surface of the particles as recited in the last line of claim 1 is addressed in column 41, lines 33-66 et al.” (Substitute Answer, page 5, last line to page 6, line 2). We agree with

³We note that the tenor of the disclosure as a whole indicates that “highly disperse” may be better interpreted as “highly monodisperse.”

the Appellants that Kaliski's description at column 41, lines 33-66 does not teach the claimed covalent bonding of organic groups on the surface of the oxide particles (Brief, page 4). Column 41, lines 33-66 describes imparting organophilic properties to the aggregate-TiO₂ pigment product by adding functional organic, cationically active compounds with at least two reactive groups to the solutions of inorganic crosslinking salts used for the in-situ synthesis of the complex microgel cements employed in the preferred mode of manufacturing the aggregate-TiO₂ pigment products (col. 41, lines 33-43). Kaliski specifically indicates that the functional organic compounds modify the surface of the microgel and only indirectly modify the aggregate-TiO₂ pigment products (col. 41, lines 59-66). No covalent bonding with the TiO₂ is described nor has the Examiner provided a sufficient reason to believe that such covalent bonding inherently occurs. Therefore, the claims are not anticipated by the description of aggregate TiO₂ provided by Kaliski.

In addition, the Examiner's attempt at establishing the obviousness of using a surface modified TiO₂ in the aggregate-TiO₂ of Kaliski falls short. In the argument section of the Substitute Answer, the Examiner states that "the surface modification of monodispersed particles is known and admitted conventional on page 4, line 36 - page 5, line 1 of the specification." (Substitute Answer, page 10). At page 4, line 36 - page 5, line 1, the specification states that "[a] corresponding two-stage process for the preparation of various metal oxides and also mixed oxides which moreover also have glycolic groups bonded chemically to the surface is furthermore described in EP 0 391 447." However, the

Examiner has advanced no reason, suggestion, or motivation for substituting the TiO₂ raw material described by Kaliski with the metal oxide particles having glycolic groups bonded chemically to the surface described in the specification as known in the prior art. We, therefore, agree with the Appellants that while the surface modification of monodispersed particles was known as discussed at page 4, line 36 to page 5, line 1 of the specification, the Examiner failed to establish that forming agglomerates with such particles was obvious to one of ordinary skill in the art at the time of invention (Brief, page 3).

With respect to the process of claim 6, we note that this claim excludes flocculation. In other words, the claim is limited to the process described in the specification in which binder is dissolved in solvent (specification, page 7, lines 34-37) and then oxide particles dispersed in the solution of binder and solvent (specification, page 8, lines 3-5). In contrast, Kaliski describes a process of coflocculating TiO₂ and binder dispersed in solvent. The binder of Kaliski is not dissolved in the solvent but merely dispersed as a solid. While Appellants' specification describes a process of solid binder dispersion, claim 6 excludes this alternative process.

For the above reasons, we conclude that the Examiner has failed to establish a *prima facie* case of unpatentability over Kaliski.

The Rejection over Barker

Barker describes floccular compositions containing ultrafine inorganic particles, a size-stabilizer, and a flocculation modifier which comprises a polyelectrolyte (col. 1, line 58 to col. 2, line 9). We agree with Appellants that Barker does not disclose an agglomerate having at least 70 weight percent oxide particles as required by claim 1 (Brief, page 5). Note the paragraph bridging columns 3 and 4 which states that “concentrations of ultrafine particles in the floccular composition can be as high as 60% by weight ...” In this discussion, “ultrafine particles” refers to ultrafine inorganic particles with which particles of size-stabilisers are combined. Baker suggests that concentrations of ultrafine inorganic particles above 60% by weight are not possible and therefore, concentrations in the claimed range are not obvious from the teachings of Barker.

With respect to the process of claim 6, we note that Barker forms the composition by flocculation and, as explained above, claim 6 excludes flocculation.

We conclude that the Examiner has failed to establish a *prima facie* case of obviousness over Barker.

The Rejection over Perry or Browning

Perry and Browning each generally describe the process of agglomeration. As pointed out by the Appellants (Brief, page 6), neither of these references describe agglomerating monodisperse spherical oxide particles. The Examiner notes that the monodisperse oxide particles were known in the prior art (Answer, page 8) and concludes that it would have been obvious to treat the monodisperse

powders in the same manner as other powders for the reasons set forth in Perry at page 8-57 and Browning at pages 148-149. The Examiner indicates that Browning discusses the agglomerating processing steps at pages 161-170. This section of Browning discusses agglomeration by agitation. Browning indicates that each material must be evaluated independently to determine whether agitation will produce agglomeration (page 161, col. 1, lines 8-10). Browning further indicates that the particles must be in a size range that will permit a pellet or ball to form (page 161, col. 2, lines 13-14). The Examiner has provided no evidence that those of ordinary skill in the art at the time of invention understood that monodisperse oxide particles of diameter between 10 nm and 10 μm were of a suitable size range for agglomeration by the method of Browning. From this disclosure, one of ordinary skill in the art would not have had a reasonable expectation of success of forming a free-flowing powder of agglomerates containing 1-500 μm diameter monodisperse oxide particles. Therefore, we agree with the Appellants that the generic descriptions of agglomeration provided by Perry and Browning do not render the preparation and process of the claims obvious (Brief, page 6).

We conclude that the Examiner has failed to establish a *prima facie* of obviousness over either Browning or Perry.

CONCLUSION

To summarize, the decision of the Examiner to reject claims 1 and 5-10 under 35 U.S.C. §§ 102(e) and 103 is reversed.

REVERSED

JOHN D. SMITH)
Administrative Patent Judge)
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) BOARD OF PATENT
PETER F. KRATZ) APPEALS
Administrative Patent Judge) AND
) INTERFERENCES
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