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Todd A. VAUGHN
Jordan IP Law, LLC
12501 Prosperity Drive, Suite 401
Silver Spring, MD 20904

EXAMINER	
TAI, XIUYU	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FRÉDÉRIC BOUYER, BRUNO VUILLEMIN, and FABIEN GABEN

Appeal 2018-008169
Application 14/355,148
Technology Center 1700

Before GRACE KARAFFA OBERMANN, DEBRA L. DENNETT, and LILAN REN *Administrative Patent Judges*.

DENNETT, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Appellant[2] appeals under 35 U.S.C. § 134(a) from a final rejection of claims 16–24, 26–29, 31, and 37.[3] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

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[1] In our Decision, we refer to the Final Office Action dated June 6, 2017 ("Final Act."); the Appeal Brief filed March 28, 2018 ("Br."); the Advisory Action dated May 18, 2018 ("Adv. Act."); and the Examiner's Answer dated May 23, 2018 ("Ans."). Appellant did not file a Reply Brief.

[2] 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 I-TEN. Br. 3.

[3] Claims 25, 30, and 32–36 are withdrawn from consideration. Final Act. 1.

The invention relates to a process for making dense thin films by electrophoresis. Spec. 1, l. 4–7. Claim 16, reproduced below from the Claims Appendix of the Appeal Brief, illustrates the claimed subject matter:

> 16. A process for deposition of a dense film having at least one material Px on a substrate, the process comprising:
>
> providing a colloidal suspension containing nanoparticles of said at least one material Px, wherein the diameter of said nanoparticles of the at least one material Px is less than 100 nm;
>
> immersing, together with a counter electrode, said substrate in said colloidal suspension;
>
> applying an electrical voltage between said substrate and said counter electrode to obtain an electrophoretic deposition of a compact film having nanoparticles of said at least one material Px on said substrate;
>
> drying said compact film;
>
> mechanically consolidating said dried, compact film; and
>
> conducting a thermal consolidation of said dried, compact film at a temperature that does not exceed 0.7 times a melting or decomposition temperature of the at least one material Px having the lowest melting temperature of the at least one material Px present,
>
> wherein, after mechanical consolidation and thermal consolidation, the density of the compact film is 80% of a theoretical density of a solid substance.

REFERENCES

The Examiner relies on the following prior art in rejecting the claims on appeal:

Frey	US 2004/0259713 A1	Dec. 23, 2004
Lee et al. (“Lee”)	US 2011/0100532 A1	May 5, 2011
Ahn et al. (“Ahn”)	US 2011/0240112 A1	Oct. 6, 2011
Joung et al. (“Joung”)	US 2012/0211365 A1	Aug. 23, 2012

REJECTION

The Examiner maintains the rejection under 35 U.S.C. § 103 of (1) claims 16–24, 26–28, and 37 over Joung in view of Lee, as evidenced by Frey; and (2) claims 29 and 31 over Joung and Lee, further in view of Ahn. Final Act. 3–7. The Examiner provisionally rejects claims 16–19, 21, 26, 27, 29, and 31 on the ground of non-statutory double patenting over (a) claims 18–24, 27, 29, and 38 of co-pending Application No. 14/355,182 (now U.S. Patent 9,660,252), and (b) claims 15, 16, 24–29, and 32 of co-pending Application No. 14/355,179 (now U.S. Patent 10,340,548).

OPINION

Rejection of claims 16–24, 26–28, and 37 as obvious over Joung in view of Lee, as evidenced by Frey

Appellant argues claims 16–24, 26–28, and 37 as a group. Br. 5–10. We select the sole independent claim, claim 16, as representative of the group. Claims 17–24, 26–28, and 37 will stand or fall with claim 16. 37 C.F.R. § 41.37(c)(1)(iv).

With respect to claim 16, the Examiner finds that Joung discloses a method of depositing a layer of nanoparticles on a substrate, the method comprising the steps of (1) providing a suspension containing SiO_2 and/or TiO_2 nanoparticles having a size range of 1 to 100 nm; (2) immersing electrodes in the suspension; (3) electrophoretically depositing nanoparticles on one of the electrode by applying a voltage between the electrodes; (4) drying the depositing film on the electrode; and (5) heating the dried film on the electrode at a temperature of 550°C. Final Act. 3. The Examiner cites to Frey as evidence that the melting point of TiO_2 is 1840°C. *Id.* The

Examiner finds that Joung's heating temperature of 550°C does not exceed 0.7 x 1840°C (as required by claim 16). *Id.*

The Examiner interprets the "compact film" of claim 16 as "a dense film/layer" or "a film/layer formed from electrophoretic deposition." *Id.* at 10. The Examiner determines that Joung teaches forming a dense film by electrophoretic deposition, thus Joung teaches forming a "compact film," as claimed in claim 16. *Id.*

The Examiner finds that Lee discloses a method of depositing nanoparticles on a conductive substrate by electrophoretic deposition, then applying a compression pressure to the deposited film. *Id.* at 3–4. The Examiner finds that Joung does not teach mechanically consolidating the dried film, but that Lee discloses the formed layer can be compressed to increase the linkage between the particles within the formed layer. *Id.* The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Joung and compress the formed layer after electrophoretic deposition as suggested by Lee in order to increase the linkage between particles within the formed layer. *Id.* at 4. The Examiner finds that the method of Joung combined with Lee's compression comprises substantially the same steps as the claimed method, thus a skilled artisan would have expected substantially similar film properties, such as high density/compactness or low porosity. *Id.*

Appellant contends that the Examiner's interpretation of "compact film" is unreasonable in light of the specification, pointing to the Examiner's statement that "the claim [16] does not specifically define 'a compact film' or require a certain porosity for the formed film." Br. 6–7 (quoting Final

Act. 10). Appellant identifies paragraph 53 of the published version of the Application[4] as defining "compact film":

> A compact deposit is a deposit without any cavities or cracks. On the other hand, it does have porosity in a ratio expressed as a percentage and calculated as follows:
>
> > Porosity[%]=[(density of the solid-state material–real density)/real density] x 100
>
> knowing that the "real density" is the density measured on the deposited film and the density of the solid-state material is the solid density of the deposited material, ignoring the presence of particles that create porosity when stacked.

Br. 10. Appellant argues that the importance of a compact film deposition is articulated throughout the specification, quoting paragraph 55 as an example:

> Deposition is preferably done from very stable colloidal suspensions so as to obtain a deposit with a perfectly uniform thickness with no roughness, few defects and ***as compact as possible after the electrophoretic deposition process. This minimizes the formation of pores, cavities and clusters that hinder consolidation of the deposit***. The stability of suspensions depends on the size of the particles and the nature of the solvent used and the stabilizer if a stabilizer was used to stabilize the colloidal suspension.

Br. 7.

During prosecution, an application's claims are given their broadest reasonable scope consistent with the specification. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). The words used in a claim must be read in light of the specification, as it would have been interpreted

[4] Appellant cites to US Pat. Pub. No. 2014/0335085 A1, the published version of Application 14/355,148. Br. 7. For consistency, we follow Appellant's practice.

by one of ordinary skill in the art at the time of the invention. *Id.*; *see also In re Morris*, 127 F.3d 1048, 1054–55 (Fed. Cir. 1997) (holding that during prosecution claim terms are given "the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification.").

Appellant defines "compact deposit"[5] in the Specification: requiring no cavities or cracks and a specific porosity. Spec. ¶ 53. The Examiner's construction of the term as merely "a dense film" or "a film/layer formed from electrophoretic deposition" is overly broad under these circumstances. *See* Final Act. 10. The broadest reasonable interpretation of "compact film" in claim 16 is a dense film having no cavities or cracks and porosity in a ratio expressed as a percentage and calculated as follows:

> Porosity[%]=[(density of the solid-state material–real density)/real density] x 100

knowing that the 'real density' is the density measured on the deposited film and the density of the solid-state material is the solid density of the deposited material, ignoring the presence of particles that create porosity when stacked. *See* Spec. ¶ 53.

The Patent and Trademark Office bears the burden of establishing a case of prima facie obviousness. *In re Bell*, 991 F.2d 781, 783 (Fed. Cir. 1993) (citing *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). Given the overly broad construction of "compact film," upon which the rejection is based, the Examiner fails to establish that the combined references teach all

[5] "Compact deposit" and "compact film" are used interchangeably in the Specification. *See* Spec. Abstract, ¶¶ 5, 7, 23, 31, 46, 53, and 55.

of the claimed limitations. The Examiner's unsupported assertion that the steps are substantially the same, thus the results would be substantially the same, is inadequate without further support or explanation. *See Fine*, 837 F.2d at 1074. The rejection lacks specific finding regarding whether the references teach "compact film" as correctly construed in light of the Specification. Therefore, we reverse the rejection of claim 16 over Joung in view of Lee, as evidenced by Frey. We likewise reverse the rejection of dependent claims 17–24, 26–28, and 37 for the same reason.

Rejection of claims 29 and 31 as obvious over Joung in view of Lee and Ahn

Claims 29 and 31 depend from claim 16. Br. 17–18. Because the rejection of claim 16 is reversed, we also reverse the rejection of claims 29 and 31 as obvious.

Double patenting rejections

The Examiner rejected claims 16–19, 21, 26, 27, 29, and 31 (provisionally) on the ground of non-statutory double patenting over (a) claims 18–24, 27, 29, and 38 of co-pending Application No. 14/355,182 (issued May 23, 2017 as US 9,660,252 B2), and (b) claims 15, 16, 24–29, and 32 of co-pending Application No. 14/355,179 (issued July 2, 2019 as US 10,340,548 B2). When the co-ending applications issued as patents, the provisional rejection became an actual double patenting rejection.

Appellant does not address the double patenting rejection in the Appeal Brief. *See* Br. *generally*. In addition, we do not find a terminal

disclaimer related to either patent in the file history.[6] Under these circumstances, we summarily affirm the double patenting rejection.

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
16–24, 26–28, 37	103(a)	Joung, Lee, Frey		16–24, 26–28, 37
29, 31	103(a)	Joung, Lee, Ahn		29, 31
16–19, 21, 26, 27, 29, 31		Obviousness-type Double Patenting	16–19, 21, 26, 27, 29, 31	
Overall Outcome			16–19, 21, 26, 27, 29, 31	20, 22–24, 28

AFFIRMED IN PART

[6] The submission of a terminal disclaimer in compliance with 37 C.F.R. § 1.321(b) to overcome a double patenting rejection ensures that a patent owner with multiple patents claiming obvious variations of one invention retains all those patents or sells them as a group. *In re Van Ornum*, 686 F.2d at 937, 944–45 (CCPA 1982).