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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LUC NOUVELOT, JOHANN ROTTE,
KARIN SCHERER, and DANIEL VALLET [1]

Appeal 2019-006007
Application 15/094,235
Technology Center 1700

Before ERIC B. GRIMES, LINDA M. GAUDETTE, and LILAN REN,
Administrative Patent Judges.

GRIMES, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to an optical article with antireflection properties, which have been rejected as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] Appellant identifies the real party in interest as Essilor International. Appeal Br. 3. We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42.

STATEMENT OF THE CASE

"An antireflection coating is . . . a coating, deposited onto the surface of an optical article." Spec. 2:16–17. "Anti-reflection coatings are well known and . . . are preferably multilayered coatings comprising alternatively high refractive index layers and low refractive index layers." *Id*. at 2:20–24.

The Specification states that

> patent application WO 2005/059603[2] . . . describes an ophthalmic lens substrate coated with a multilayered colored antireflection coating, deposited without ion assistance, and with an anti-fouling coating. The antireflection coating is composed of a 100–110 nm-thick silica sub-layer, and of . . . alternating high refractive index layers and low refractive index layers.

Id. at 3:18–24. The Specification states that "[t]he optical article manufactured according to . . . WO 2005/059603 has good abrasion resistance properties, which may nevertheless be further improved." *Id*. at 3:29–31.

"According to the present invention, a sub-layer is used in combination with a multilayered stack comprising" high- and low-refractive index layers. *Id*. at 9:1–3. "The sub-layer of the invention is a multilayered sub-layer (laminated), preferably a bilayer." *Id*. at 9:13–14. "[T]he second of these two adjacent layers to be deposited . . . possess[es] a higher density as compared to that of the first one, because it was formed under ion assistance whereas the first of these two adjacent layers to be deposited was not." *Id*. at 9:24–26. The Specification states that this structure "improve[s] the abrasion resistance

[2] WO 2005/059603 is the Thomas reference cited by the Examiner.

of the final article while limiting the increase in the compressive stress so as to avoid any antireflection coating structural weakening." *Id*. at 12:11–13.

Claims 1–20 are on appeal. Claim 1, reproduced below, is illustrative (emphasis added):

> 1. An optical article with antireflection properties, comprising a substrate having at least one main surface coated with an antireflection coating comprising, starting from the substrate:
>
> a sub-layer comprising two adjacent layers, the sum of the thicknesses of the two adjacent layers being greater than or equal to 75 nm; and
>
> multilayered antireflection stack comprising at least one high refractive index layer and at least one low refractive index layer,
>
> wherein the second adjacent layer of the sub-layer is directly deposited upon the first adjacent layer of the sub-layer,
>
> wherein the deposition of the first adjacent layer of the sub-layer has been carried out without ion assistance and the *deposition of the second adjacent layer of the sublayer has been carried out under ion assistance*, and
>
> wherein the sub-layer is deposited on an abrasion- and/or scratch-resistant coating.

The claims stand rejected as follows:

Claims 1–6 and 8–20 under 35 U.S.C. § 103 as obvious based on Thomas[3] and Klemm[4] (Ans. 3) and

[3] Thomas et al., WO 2005/059603 A1, published June 30, 2005. The Examiner cites to Thomas et al., US 2007/0178315 A1, published August 2, 2007, as the English-language equivalent. Appellant does not dispute that the disclosures of the US publication and the WO publication are equivalent.
[4] Klemm et al., US 2003/0116872 A1, published June 26, 2003.

Claim 7 under 35 U.S.C. § 103 as obvious based on Thomas, Klemm, and Schulz[5] (Ans. 5).

OPINION

All of the claims stand rejected as obvious based on Thomas and Klemm, and further in view of Schulz in the case of claim 7. The same issue is dispositive for both rejections.

The Examiner finds that Thomas discloses "a coated optical article . . . compris[ing] a transparent substrate upon which, in order, a primer coating, anti-abrasion coating, an SiO_2-based layer that is over 75 nm thick, and an AR [antireflection] stack formed from alternating high and low [refractive] index layers are disposed." Ans. 3. The Examiner interprets "the SiO_2-based layer as the presently claimed sub-layer" but acknowledges that "Thomas is silent to the sub-layer being two adjacent layers as claimed." *Id*.

The Examiner finds, however, that "Klemm discloses a first thin sub-layer deposited by vacuum evaporation and a second sub-layer deposited by an ion-assisted vacuum deposition process wherein the materials are each silicon dioxide." *Id*. at 4. The Examiner finds that "[t]he two-stage adhesion coating aids in providing good adhesion between the topcoat and the AR stack." *Id*. The Examiner acknowledges that "sub-layers are deposited in reference to the hydrophobic topcoat and the AR stack," but reasons as follows:

> [T]he hydrophobic topcoat comprises a silicon-containing organic compound. Given that an epoxysilane [i.e., the material of Thomas' anti-abrasion coating] is a silicon-containing

[5] Schulz et al., "Optical coating on transparent plastics," VIP Vacuum's Best, pp. 26–29 (2005).

> organic compound, there is reasonable expectation of success of using the two-stage adhesion coating disclosed by Klemm as the SiO_2-based layer of Thomas in order to provide improved adhesion between the anti-abrasion coating . . . and the AR stack since both the topcoat and the anti-abrasion coating are both formed from silicon-containing organic compounds.

Id.

Appellant argues that Klemm's layer 21, which the Examiner refers to as corresponding to the sub-layer of claim 1, "is composed of 'two sub-layers,' . . . [but] does not correspond to the sub-layer as presently claimed because it is not located between the substrate and the antireflection stack. Rather, it constitutes the external layer of the anti-reflection stack 20 and is adjacent to the hydrophobic top coat 10." Appeal Br. 6.

Instead, Appellant argues,

> [s]ub-layer 25 of Klemm corresponds to the presently claimed sub-layer because it resides on an abrasion- and/or scratch-resistant coating 30 . . . [and] "promote(s) adhesion of the AR stack (20) to the siloxane-based anti-scratch coating (30)." This arrangement corresponds exactly to the abrasion-resistant coating/sub-layer/anti-reflection stack arrangement of the presently claimed invention.

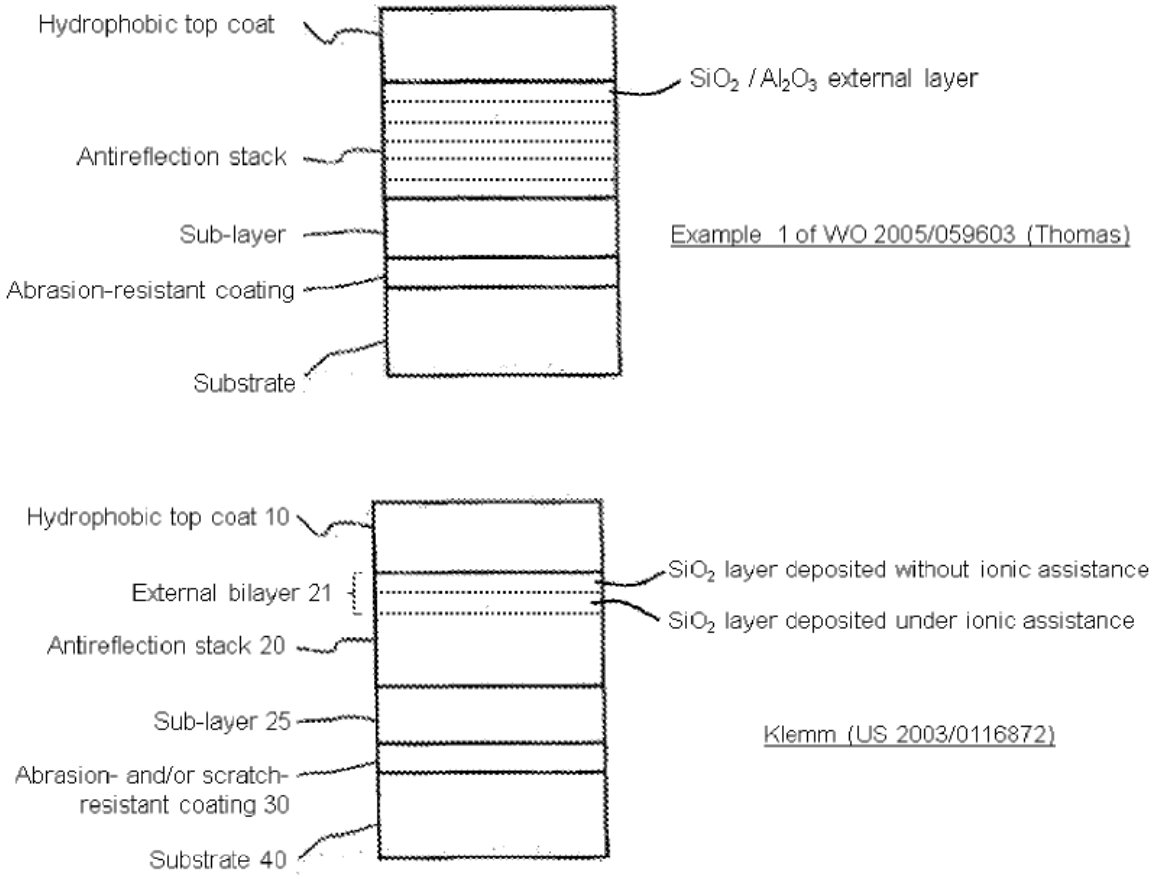
Id. at 5 (citation omitted).

Appellant also argues that "[t]he mere fact that the compounds of the hydrophobic top coat and the anti-abrasion coating may both be silicon-containing organic compounds is not sufficient to establish a similarity between the two materials." *Id*. at 9. Rather, Appellant argues, "[t]he silicon components of the hydrophobic top coat of Klemm are hydrophobic fluorinated compounds, and their chemical makeup and physical properties

are very different from that of the epoxysilanes used in the anti-abrasion coating of Thomas." *Id*.

Appellant argues that "[l]ayer 21 . . . is described by Klemm as making the hydrophobic top coat 10 adhere to the anti-reflecting coating 20." *Id*. at 8. Likewise, "[s]ub-layer 25 of Klemm is provided to promote adhesion between anti-reflecting stack 20 and scratch-resistant coating 30, however, this layer is provided as a single layer, and is not deposited as a two-stage layer like layer 21." *Id*. at 10. Appellant points out that "Thomas does not disclose problems of poor adhesion associated with anti-abrasion coatings because the anti-abrasion coating layer of Thomas is made of different materials that exhibit different properties." *Id*. Thus, Appellant argues, "[t]here is no motivation in the disclosure of Klemm to adapt the two-stage deposition process of layer 21 to the deposition process of (single layer) sublayer 25 because the two different layers are provided to adhere layers made of different materials." *Id*. at 10–11.

We agree with Appellant that the Examiner has not shown that a skilled artisan would have had a reason to modify Thomas in the manner required by the claims. Appellant accurately summarizes the arrangement of the relevant layers in the optical articles of Thomas and Klemm in the diagram provided at page 12 of the Appeal Brief, which is reproduced below:



The diagram shows the layers of the optical articles in Thomas and Klemm, arranged with the substrate at the bottom and the hydrophobic top coat at the top.

As shown, the sub-layer defined by the claims corresponds to the sub-layer ("layer n° 1") of Thomas and sub-layer 25 of Klemm, because those layers are positioned between an abrasion-resistant coating and the antireflection stack. *See* Thomas ¶¶ 92–97 (An anti-abrasion coating was applied to the substrate, then pre-cleaned and "an anti-scratch SiO_2 layer (layer n° 1) was deposited . . . by evaporating the silicon source material" without ion assistance.); Klemm ¶ 95 ("[A] thin layer of SiO_2 25 . . . is deposited. This layer 25 promotes the adhesion between the anti-reflecting stack and the scratch-resistant coating 30.").

Thomas' anti-abrasion layer and Klemm's scratch-resistant coating are composed of the same type of material. *See* Thomas ¶¶ 92–93 (The example's anti-abrasion coating is "[e]poxysilane hydrolyzate (γ-glycidoxy-propyltrimethoxysilane.)"); Klemm ¶ 99 ("The most preferred scratch-resistant coating compositions are those comprising as the main constituents an epoxyalkoxysilane such as, for example, γ-glycidoxypropyltrimethoxy-silane.").

Klemm states that "[i]n order to improve adhesion of the anti-reflecting coating 20 *onto the hydrophobic top coat* 10 . . . , the SiO_2 layer 21 of the anti-reflecting coating is deposited on the top coat 10 using a two-stage process." Klemm ¶ 91 (emphasis added). Klemm describes this two-stage process as necessary because the hydrophobic top coat has a tendency to adhere poorly to the anti-reflecting coating, a problem that is solved by depositing the first layer of the anti-reflecting stack in the disclosed two-stage process. *See id*. ¶¶ 34, 38, 49–50.

By contrast, Klemm does not note any problems with the adhesion of SiO_2 layer 25 to the adjacent scratch-resistant coating, nor does it describe a two-stage deposition process like the one used for layer 21. Klemm simply states that "after deposition of the four-layer anti-reflecting stack, a thin layer of SiO_2 25 of 1 to 50 nm thick, is deposited." *Id*. ¶ 95.

In summary, we agree with Appellant that the Examiner has not provided sufficient evidence or sound technical reasoning to show that a skilled artisan would have had a reason to apply the two-stage deposition process disclosed by Klemm—for a SiO_2 layer between a hydrophobic top coat and an anti-reflecting stack—to the SiO_2 layer of Thomas' article that is

positioned between *an anti-abrasion coating* and an anti-reflecting stack. We therefore reverse the rejection of claims 1–6 and 8–20 under 35 U.S.C. § 103 based on Thomas and Klemm. For the same reason, we reverse the rejection of claim 7 under 35 U.S.C. § 103 based on Thomas, Klemm, and Schulz.

DECISION SUMMARY

In summary:

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–6, 8–20	103	Thomas, Klemm		1–6, 8–20
7	103	Thomas, Klemm, Schulz		7
Overall Outcome				1–20

REVERSED