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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JANG YEON HWANG, DONG RYUL KIM,
and SEOUNG LAC MA

Appeal 2020-003817
Application 13/513,474
Technology Center 1700

Before MICHAEL P. COLAIANNI, DEBRA L. DENNETT, and
SHELDON M. McGEE, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) the final rejection of claims 1, 7, 9–13, 16–18, and 20. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We REVERSE.

¹ 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 LG Chem, Ltd. (Appeal Br. 2).

STATEMENT OF THE CASE

Appellant's invention is directed to: (i) a barrier film and (ii) a display device, such as a liquid crystal, an electronic ink, or an organic light-emitting diode (OLED) type, which includes the described barrier film (Spec. ¶¶ 1, 2). The Specification describes that a heavy, fragile, and inflexible glass plate is conventionally used as a cover plate to protect a display device's internal electric elements from exposure to moisture and oxygen (*id.* ¶ 3). Attempts to substitute glass plates with lightweight and impact resistant plastic films have resulted in films said to exhibit poor gas and moisture barriers or unsatisfactory light transmissivity as compared to glass plates (Spec. ¶¶ 4–7). The described plastic barrier film is said to possess excellent properties for excluding gas and moisture, while providing light transmissivity (*id.* ¶¶ 4, 8).

Claim 1 is illustrative (emphasis added):

1. A barrier film comprising:

a stacked sheet having a top surface and a bottom surface and comprising:

at least two first layers formed of a semicovalent inorganic material; and

at least one second layer formed of an ionic inorganic material,

wherein:

each second layer is disposed between two first layers with one first layer in contact with a first surface of the second layer and the other first layer

in contact with an opposite second surface of the second layer,

each first layer and second layer are alternately disposed,

the first layers are disposed to form both the top and bottom surfaces of the stacked sheet,

the semicovalent inorganic material comprises a metal oxide, a nitride of the corresponding metal or a mixture thereof, all of which have a binding energy of 530.5 eV to 533.5 eV,

the ionic inorganic material comprises a metal oxide, a nitride of the corresponding metal or a mixture thereof, all of which have a binding energy of 529.6 eV to 530.4 eV,

the difference in binding energy between the semicovalent inorganic material and the ionic inorganic material is in the range of 0.1 eV to 3.9 eV, and

the ionic inorganic material is an oxide, a nitride or a nitride oxide including at least one metal selected from the group consisting of calcium, zinc, zirconium, indium and cerium.

Appeal Br. 24 (Claims App.) (emphasis added).

Appellant appeals the rejection of claims 1, 7, 9–13, 16–18, and 20² under 35 U.S.C. § 103(a) as unpatentable over Matsui et al. (WO

² Though not listed in the statement of rejection, the Examiner includes claim 20 as part of the body of the rejection on pages 7–8 of the Final Office Action.

2008/059925 A1, published May 22, 2008),³ in view of Graff et al. (US 2002/0125822 A1, published Sept. 12, 2002, “Graff”) (Final Act. 2–8).

FINDINGS OF FACT & ANALYSIS

Appellant’s arguments for reversal of the Examiner’s rejection of claims 1, 7, 9–13, 16–18, and 20 focus on limitations recited in independent claim 1 (*see generally* Appeal Br. 11–22; Reply Br. 6–7). We select claim 1 as representative of claims 1, 7, 9–13, 16–18, and 20.

The Examiner’s findings and conclusions regarding Matsui and Graff are located on pages 2–8 of the Final Office Action. To resolve the present appeal, we need only discuss the findings and conclusions regarding Matsui with respect to the subject matter of claim 1.

The Examiner finds Matsui’s barrier film contains each component and limitation recited in claim 1 including: (i) the first and second layers, (ii) the binding energy of each layer, and (iii) the formation of the second layer from an ionic zinc oxide material (Final Act. 2–5).⁴

With respect the claimed second layer, the Examiner finds, *inter alia*, Matsui’s paragraph 78 teaches that the ionic inorganic second layer is disposed between two or more first layers, which are formed from

³ The Examiner relies on Matsui et al. (US 2010/0015431 A1, published Jan. 21, 2010, “Matsui”), the US publication resulting from the national stage entry of the PCT document. Appellant does not contest the Examiner’s reliance on Matsui. Accordingly, we cite to the US publication of Matsui in the decision.

⁴ The Examiner relies on Graff for teaching a barrier film layer, which is also formed from zinc oxide along with other metal oxides and a metal nitride formed from the Markush group of metals recited in claim 1 (Final Act. 5).

semicovalent inorganic material (*id.* at 2–3). In the alternative, the Examiner finds, *inter alia*, that Matsui’s paragraph 73 teaches the claimed second layer by disclosing that an anchor coating may be formed from various inorganic compounds (*id.* at 3).

Appellant argues that Matsui’s anchor coat layer is distinguished from the second layer subject matter of claim 1 (Appeal Br. 14). Appellant argues that the Examiner’s reliance on Matsui’s paragraph 73 is misplaced because Matsui’s anchor coat layer “is **not** formed of the instantly recited ionic inorganic material that is an oxide, nitride or nitric oxide including calcium, zinc, zirconium, indium and/or cerium” (*id.* at 15). Appellant contends that one of ordinary skill in the art would have known that Matsui’s “‘anchor’ coat layer is a layer [for] improving interlayer adhesiveness between two layers,” but not for conferring the film’s gas barrier property (*id.*; *see also* Reply Br. 6 (arguing that “the AC [‘anchor coat’] layer . . . is logically and always disposed between two inorganic thin films or between the inorganic thin film and some other layer”) (citing Matsui ¶¶ 73–77)).

The Examiner responds by reiterating that Matsui’s disclosure of an inorganic thin film formed from zinc oxides on paragraph 78 teaches the claimed second layer (Ans. 13, 15). The Examiner contends that “**Matsui** discloses [the claimed] first layer being silicon nitride/oxygen nitride composite film, SION layer” (*id.* at 13; *see also* Final Act. 3 (citing Matsui ¶ 73)). In other words, the Examiner appears to no longer rely upon Matsui’s paragraph 73 for teaching the claimed second ionic inorganic layer (*compare* Ans. 13, 15 *with* Final Act. 3).

In view of the Examiner's restated findings in the Answer, we find Appellant's arguments persuasive that Matsui's anchor coating cannot disclose or render obvious the claimed second layer (*see* Reply Br. 4).

With respect to the Examiner's reliance upon Matsui's paragraph 78 for teaching the claimed second layer, the Examiner supports this finding by noting that Matsui's preferred combinations of barrier film layers includes embodiment "(10) Substrate film/inorganic thin film/AC/inorganic thin film/AC/inorganic thin film" (Ans. 14 (citing Matsui ¶ 86)). According to the Examiner, "the first and third inorganic thin film in Matsui[] corresponds to the claimed first layer of semicovalent inorganic materials, the intermediate inorganic thin film of Matsui[] corresponds to the claimed second layer of ionic inorganic materials" (Ans. 14).

Appellant argues that the Examiner's finding is reversibly erroneous because "the 1st and 3rd inorganic thin film layers are in contact with neither the first surface of the second inorganic thin film layer nor the opposite second surface of the second inorganic thin film layer." Reply Br. 6.

During prosecution, the PTO gives the language of the proposed claims "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." *In re Morris*, 127 F.3d 1048, 1054–55 (Fed. Cir. 1997).

On this record, Appellant persuasively argues that Matsui's structural embodiments cannot disclose or render obvious the claimed contacting limitations (Reply Br. 5–7). "Contact" is not specifically defined in the Specification. *See generally* Spec. We note that the definition of the term

“contact” requires a “union or junction of surfaces” (*see Merriam-Webster’s Dictionary* (May 24, 2021), <https://www.merriam-webster.com/dictionary/contact>). Therefore, we find that use of the term “contact” in the context of claim 1’s limitations means that the recited contact requires a junction of the surfaces of: (i) the one first inorganic material layer with the first surface of the second inorganic material layer and (ii) the other inorganic material layer with the opposite second surface of the second inorganic material layer.

In view of the instant written description, the Examiner’s implicit conclusion that claim 1 does not require a junction or contact between the claimed surfaces impermissibly reads the disputed limitation out of the claim. *See Trading Techs. Int’l, v. eSpeed, Inc.*, 595 F.3d 1340, 1352 (Fed. Cir. 2010) (holding that “the claims ‘must be read in view of the [S]pecification, of which they are a part.’”) (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (en banc), *aff’d*, 517 U.S. 370 (1996)). We note that Appellant amended the claims to introduce limitations regarding the requisite contact between the claimed surfaces of the second layer with each first layer (Amendment filed Dec. 27, 2018 (citing, *inter alia*, Spec. Example 1⁵ as support for the amended claim); *see also* Appeal Br. 6; Spec. ¶ 58, Fig. 1C).

For the reasons set forth above, we agree with Appellant that Matsui’s anchor coat layer is distinguished from the claimed second layer formed of an ionic inorganic material. We further agree with Appellant that Matsui’s

⁵ In an exemplified embodiment, the Specification describes forming a first layer by depositing SiON, forming a second layer by depositing ZnO “*on the* SiON first layer, and another first layer formed of SiON was re-deposited . . . *on the* second layer formed of ZnO to form a barrier film” (Spec. ¶ 66) (emphasis added).

anchor coating layer prevents the required contact between the claimed surfaces of the second layer with each first layer. We find that the Examiner engaged in impermissible hindsight in rejecting claim 1. The Examiner reversibly errs in concluding that Matsui, either with or without Graff, teaches each and every limitation of claim 1.

On this record, we reverse the Examiner's 35 U.S.C. § 103(a) rejection of claims 1, 7, 9–13, 16–18, and 20.

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 7, 9–13, 16–18, 20	103(a)	Matsui, Graff		1, 7, 9–13, 16–18, 20

REVERSED